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THE MACINTOSH® MAGAZINE

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Apple's Consumer Machines

An In-Depth Report
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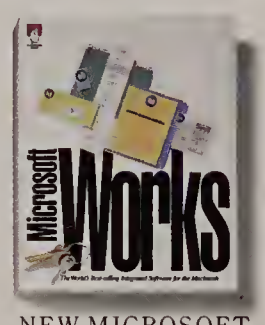

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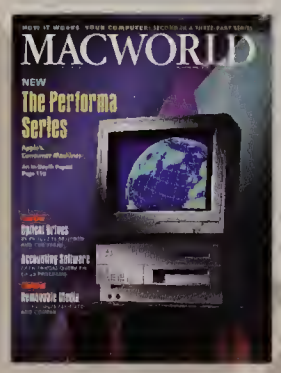

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November 1992, Volume 9, Number 11 *Macworld* (issn 0741-8647) is published monthly by Macworld Communications, Inc., 501 Second St., San Francisco, CA 94107. Subscription rates are $30 for 12 issues, $60 for 24 issues, and $90 for 36 issues. Foreign orders must be prepaid in U.S. funds with additional postage. Add $18 per year for postage for Canada and Mexico subscribers. Add $69 per year for foreign postage to all other countries. Second-class postage paid at San Francisco, California, and at additional mailing offices. **Postmaster:** Send address changes to Macworld, P.O. Box 54529, Boulder, CO 80323-4529. Editorial and business offices: 501 Second St., San Francisco, CA 94107, 415/243-0505

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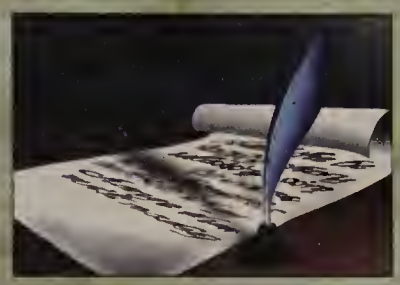
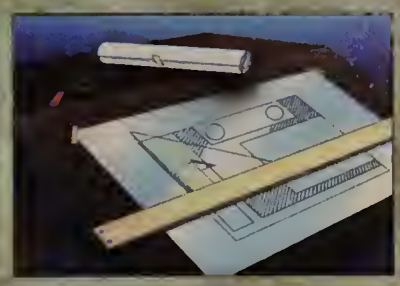


By the 18th Century we had advanced to the drafting table with T-squares, and the dreaded eraser.



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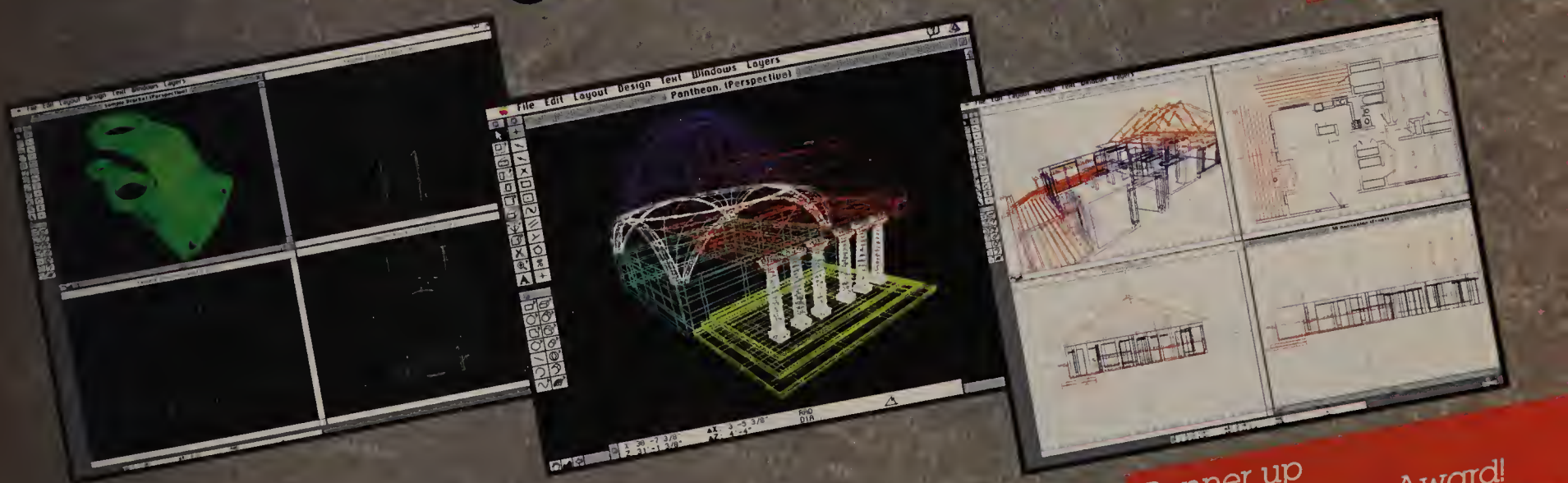

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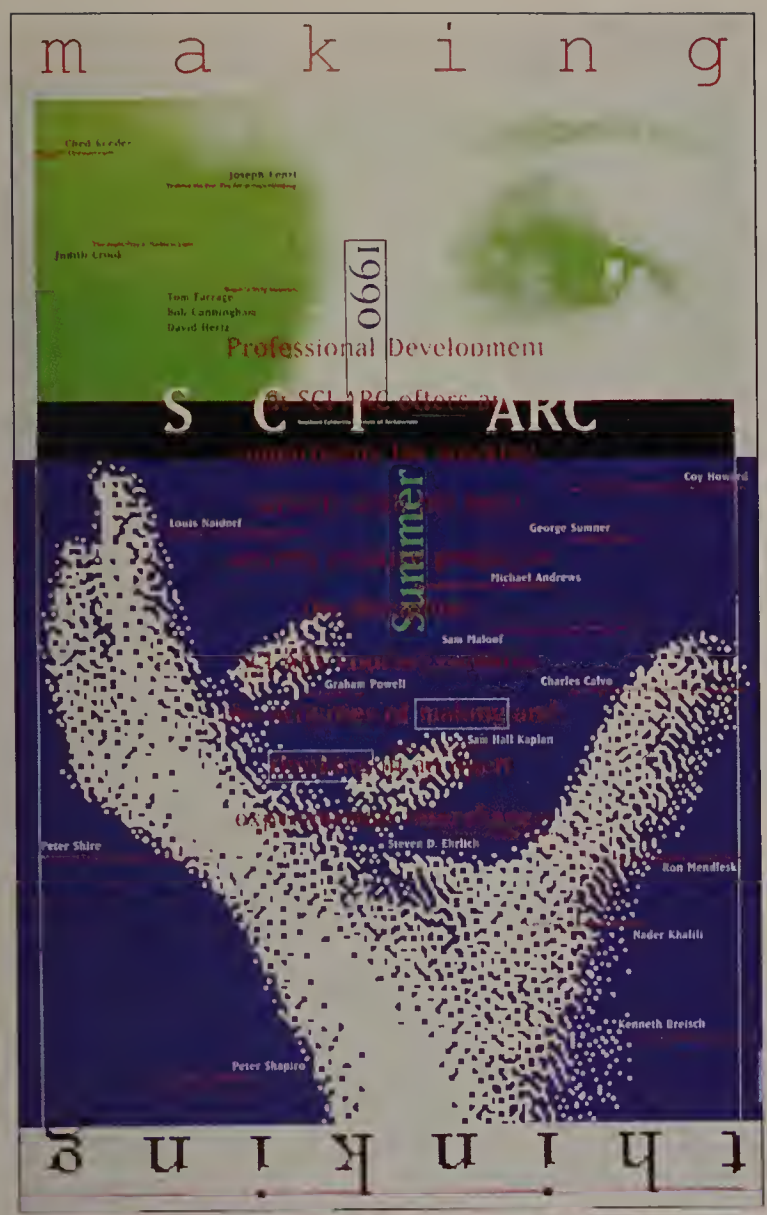

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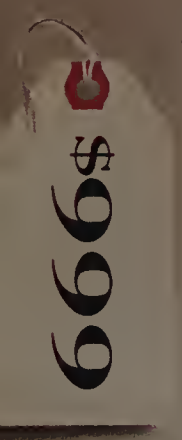

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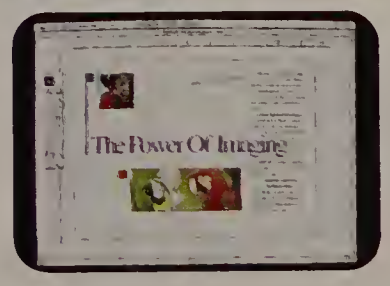

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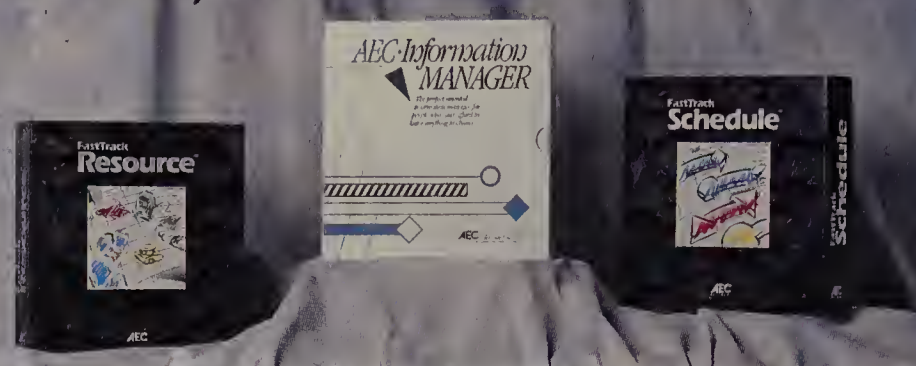

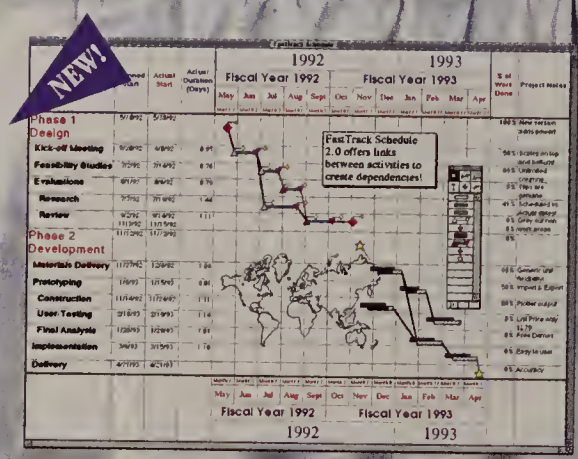

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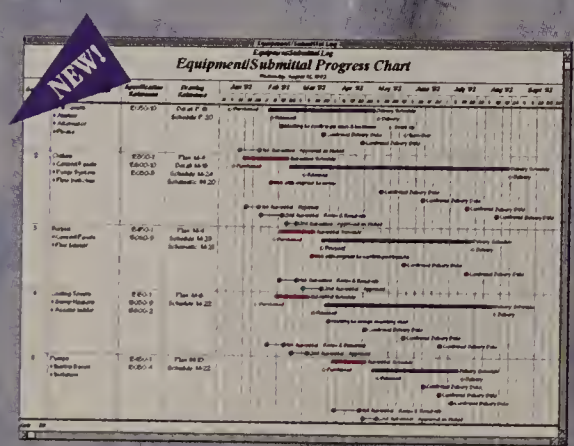

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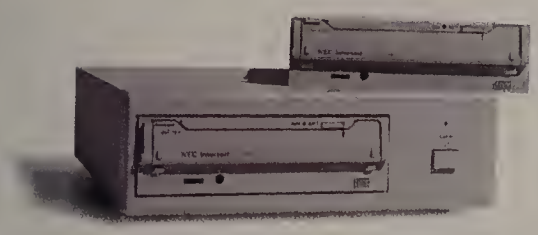

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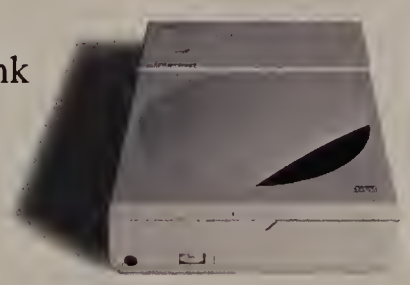

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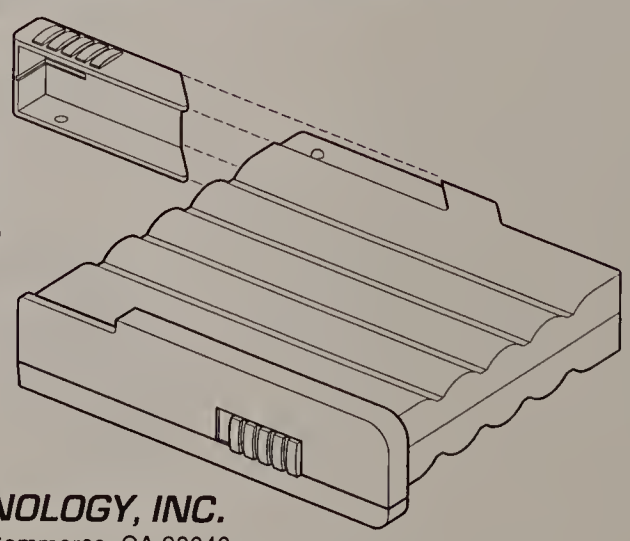

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MacBulletin

LATE-BREAKING NEWS

A shortage of Quadra 950s has resulted from several halts in production due to manufacturing problems. Dealers reported at press time that they were unable to get any of the systems. However, Apple said it has resumed shipping the 950 from its manufacturing plants in Fremont, California, and Cork, Ireland, and that any backlog should be remedied soon.

Mac Software on HP: Xcelerated Systems (619/576-3080) is shipping Liken, a $695 emulator that runs standard Mac software on HP's Apollo 9000 Series 700 workstations. Xcelerated says Apple has ignored Liken, though Apple and another Mac-emulator developer, Quorum, nearly did legal battle over patent infringement.

Microsoft Windows for Mac: Insignia Solutions (415/694-7600) is upgrading SoftPC to support Windows. SoftPC Windows runs standard Windows software on a Mac and supports VGA and extended memory. Insignia recommends using a Quadra for the $649 package, which comes preconfigured with DOS 5.0 and Windows 3.1.

DocuComp Upgraded: Advanced Software (408/733-0745) is shipping DocuComp II for $179.95. The new version runs in the background; under MultiFinder; preserves formatting, tables, and embedded graphics in the comparison document; and reads Word 5.0 and WordPerfect 2.1 files.

Disk-Syncing Utility: Microseeds Publishing's InSync will compare the contents of two volumes and update each volume with the newest versions of files. A scripting language will provide users precise control. InSync should list for $129. Microseeds' products are now distributed by Inline Design, 203/435-4995.

UpDiff takes a different approach to keeping disks in sync. It compares two files (it doesn't work on volumes) and creates an intermediate file containing just the data bits that need to be modified; UpDiff can then insert the changes into the older file. UpDiff lists for $169 from KyZen, 609/354-3863.

Amateur Geographers: For kids of all ages, MECC (612/569-1500) is shipping USA GeoGraph. GeoGraph users can perform simple statistical analyses on information (the $49.95 package includes a megabyte of U.S. demographic data) and then create many kinds of maps and graphs.

QMS unveils color printers with the company's emulations of PostScript Level 1 and Level 2. The ColorScript 210 and ColorScript 230 are thermal-transfer printers that use both QMS's Crown print architecture and a RISC processor for high speed. The $4995 ColorScript 210 prints on letter- or legal-size paper; and the $7995 model 230 prints on ledger- and Super B–size paper. Both were slated to ship in September. QMS, 205/633-4300.

Miami Hurricane: The August hurricane destroyed NuBase-publisher New Era Software's Miami offices. New Era's temporary address is 16910 Bay St. Anchorage East, #205, Jupiter, FL 33477; telephone 305/238-8408, 305/232-7467, or 305/232-7636. Miami-area Mac companies Deneba, Olduvai, and Softsync survived with minor damage and expected to reopen by the time you read this. m

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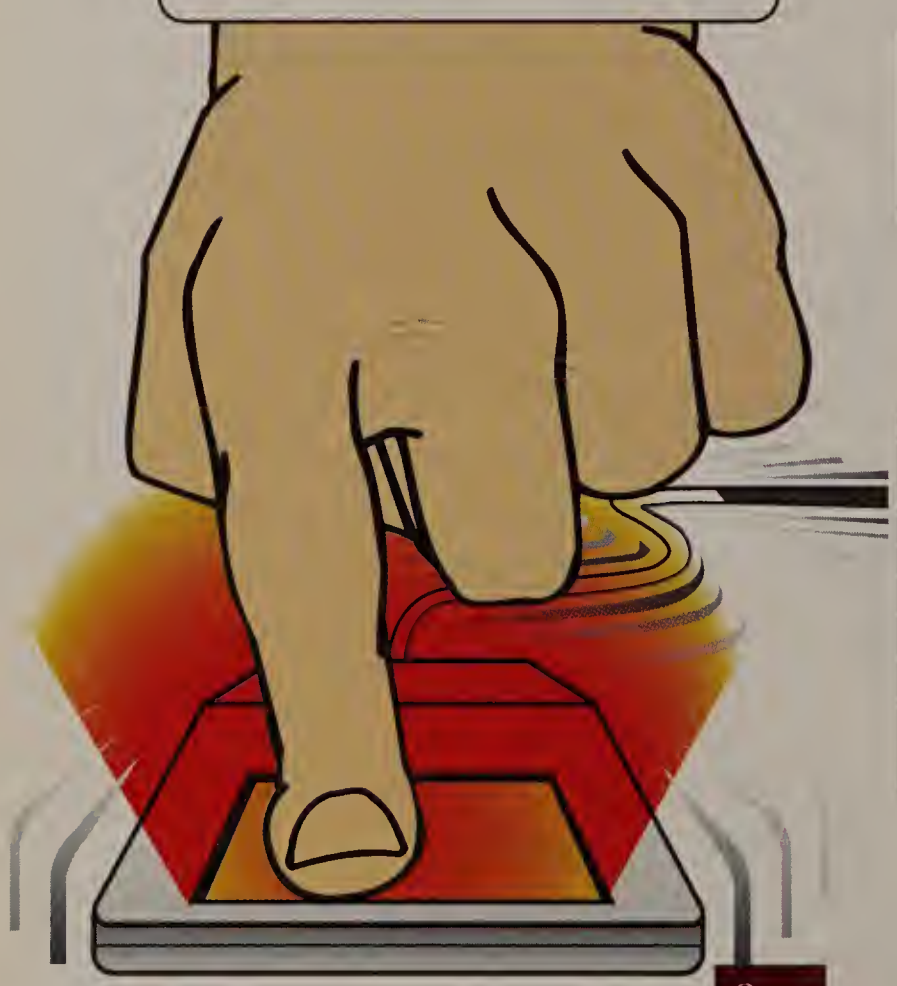

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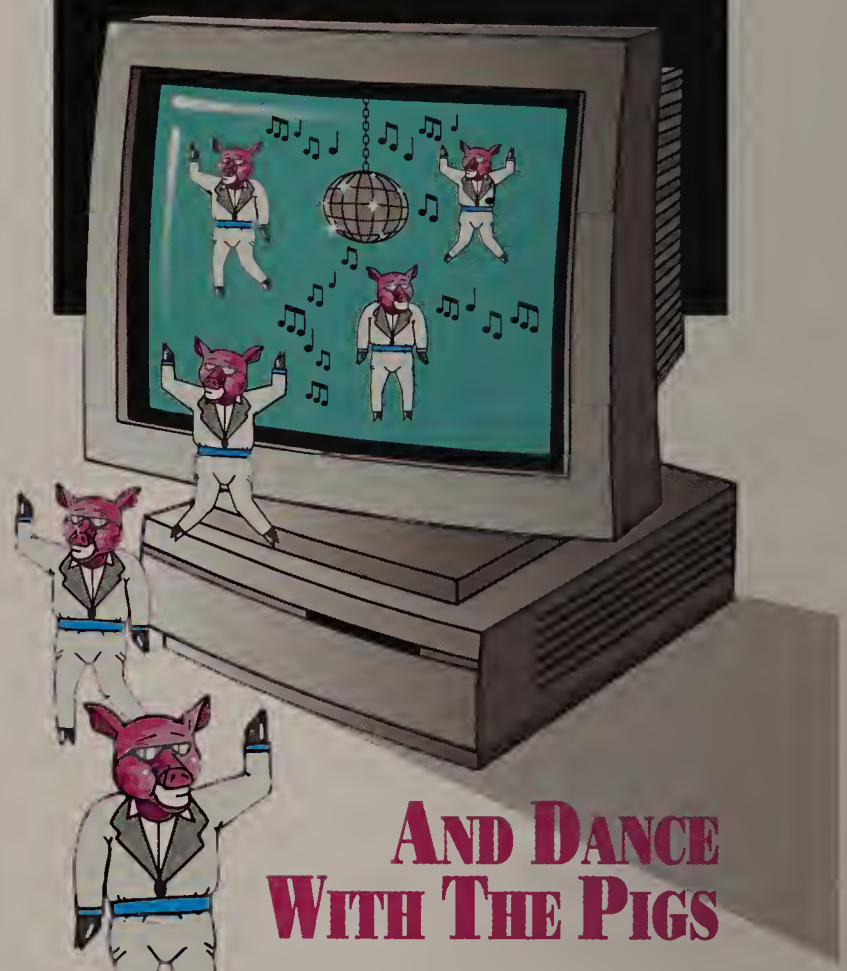

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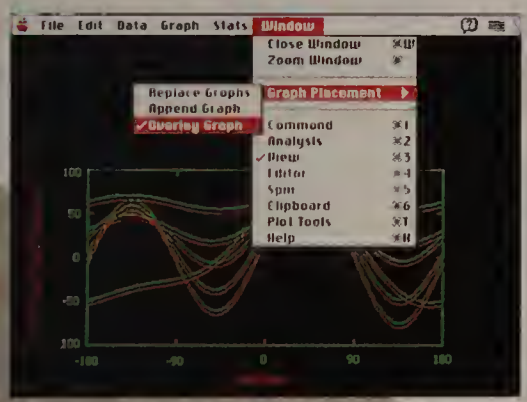

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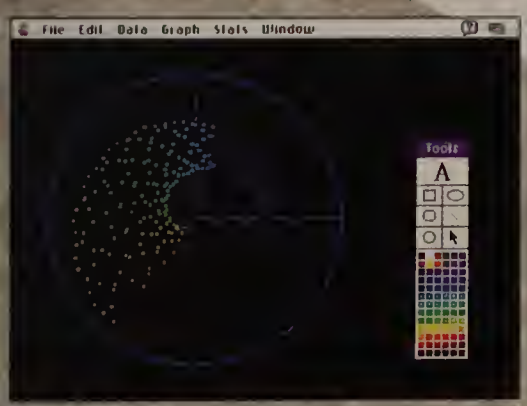

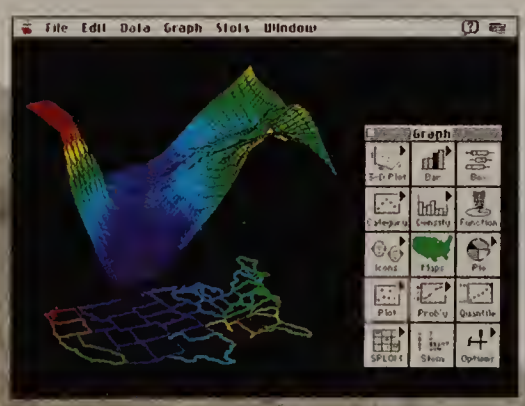

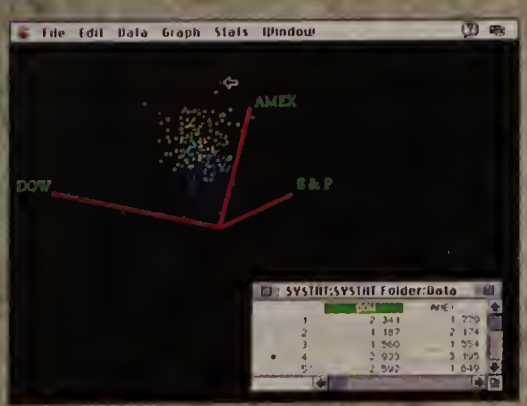

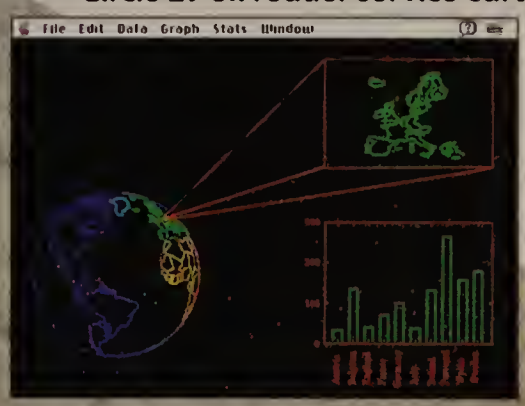

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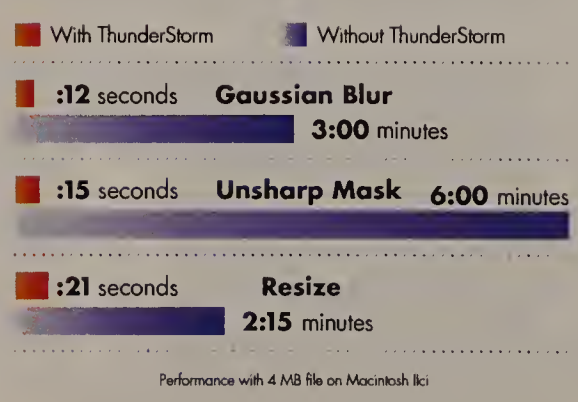

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The Editor-in-Chief Looks Back—and Forward

BY JERRY BORRELL

FOR THE LAST SEVEN YEARS I have had the honor of sitting down once a month to reflect upon the Macintosh in this column, a significant amount of rumination for me. This, my 75th editorial, marks my departure from *Macworld* magazine to head up Sumeria, a new company where several former *Macworld* colleagues and I will publish Macworld Interactive, an interactive electronic version of *Macworld* magazine.

Which makes this an extraordinary column for me to write, one of reflection. The changes at *Macworld* since my first editorial meeting more than seven years ago have been startling. At that time there were 6 of us laboring away in the shadow of our then-larger sibling publication, *PC World*, which covers the IBM side. Today there are about 50 employees in editorial and design at *Macworld*, and more than a dozen *Macworld* publications worldwide.

One of the things I am most proud of about my tenure is having one of those original staff members, Adrian Mello, succeed me as editor-in-chief at *Macworld*. Another of those original staff members, David Ushijima, is now editor-in-chief and publisher of *Macworld* Japan. Dan Farber, another founding editor, left us several years ago and is now editor-in-chief of the industry trade paper, *MacWeek*. Dennis McLeod, one of the original designers on *Macworld*, continues here today as design director of *Macworld* and an artist of growing national repute. Lon Poole and Erfert Fenton, other founding editors at *Macworld*, continue to contribute to the magazine and act as collaborators on many of our projects. Charlie Barrett—the magazine's managing editor, one of the most experienced editors in the publishing industry, and my friend of almost 15 years—will continue to oversee the entire copy and production process of the 1200 editorial pages appearing in *Macworld* each year. If one can come to view work as one's life, these last seven years have been as rich and rewarding as one could ask, thanks to these people.

Back in 1985 when I joined *Macworld*, the Mac arena was not as sanguine as today. Long lines of about-to-be-laid-off employees stood outside Jean-Louis Gassée's office at Apple Computer, wondering whether they would be able to find new jobs. Third-party Macintosh developers were dropping like flies. About 100,000 Macintosh owners read *Macworld*. The six of us at *Macworld* were shoehorned into a corridor without a network, a laser printer, a copy of PageMaker, or a testing laboratory.

Somehow we're still shoehorned into our space, but now *Macworld* occupies an entire floor of an office building in the trendy South of Market area of San Francisco. There are now more than 500,000 readers of our magazine. I'm proud to say the editors and designers have avoided the rancorous battles that mar so many major publishing houses. Looking at the *Macworld* staff, you'll see the most experienced group of Macintosh writers in the world, and one of the most talented groups of designers and art directors in the nation.

Expertise and Integrity

AS A RESULT OF THE WORK OF NEARLY a decade, *Macworld* has built a staff of unrivaled experience and integrity. Working for Adrian are senior editors Deborah Branscum, Cheryl England, and Carol Person, all of whom worked for at least two computer magazines before joining *Macworld*. Tom Moran, our hardware news editor, has experience at four other computer magazines, and his colleague Dan Littman, software news editor, was the managing editor and primary force behind *Macazine* during that publication's life. Assistant managing editor Ruth Henrich came to *Macworld* four years ago with over a decade's experience at *Mother Jones*. Her colleague Luis Camus, assistant managing editor for editorial production, came to us from *Macintosh Today*. After four years Luis and his staff, senior production editor Jo Ann Villalobos and assistant production editor Lisa Brazieal, are still working monthly production miracles. Joanne Hoffman, Arne Hurty, and Leslie Barton head up, respectively, art direction, informational graphics, and design at *Macworld* and are responsible for keeping the magazine's appearance on track through the three major redesigns since its inception. I could continue to recite a list of credits and contributions for every person making up our remaining staff, but will instead point to the over 45 editorial and design awards we have received during my tenure, making *Macworld* one of this country's most award-winning publications. Again, thanks to the magazine's editors and designers for their hard work and often-unrecognized efforts.

Seventy-five Commentaries later, an editor moves on

A New Beginning

NOW EIGHT OF US ARE STARTING over. We have the chance to develop a new *Macworld* in an interactive format. Chairman Pat McGovern, who heads our parent company, International Data Group (IDG), offered me the opportunity to form a company to explore electronic publishing based on the work we did two years ago to produce the first electronic version of a Macintosh-based magazine. As a result, Sumeria has been incorporated. With a name that I hope reflects the era of change and creativity represented in the culture of Sumer, which arguably gave Western civilization its first written language. Sumeria will publish five CD ROM–based issues of Macworld Interactive this year based upon articles in *Macworld*. The company will also explore means of distributing the magazine other than on CD ROM.

Looking Back

IT IS GOING TO BE HARD FOR Sumeria to live up to the expectations created by *Macworld* over the last seven years, a pe-

continues

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✔ Compatibility

Running thousands of older MS-DOS programs is not much of a challenge for the Orange386. The true test of compatibility lies with current PC software like Windows 3.1 and the full functionality of DOS 5.0. These all depend on "Protected Mode" which *requires* hardware to function. Also, the Orange386 has full VGA compatibility not available with software emulators. So, if running the latest and future DOS software is important, *take the challenge.*

✔ Networkability

The hardware based Orange386 offers PC serial, parallel and floppy ports; and two innovative PC/AT bus slots which allow you to add PC cards inside your Mac. Now you can direct connect to any PC dominated network by adding an Ethernet, Token Ring, Arc Net, etc. card. In terms of connectivity, the Orange386 is uncontested by its software competitors. *Take the challenge!*

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PHOTOGRAPHS BY WILL MOSGROVE

Class Picture: *Macworld*'s editorial and design staff.

riod in which the magazine has been on the forefront of many issues. I remember several in particular. In 1986 we began receiving complaints about shoddy practices among certain mail-order vendors. We took the unprecedented step of refusing to accept advertising from two specific mail-order vendors as a result of how they treated our readers. That stand cost the magazine about $200,000. I thank David Bunnell, founding publisher of *Macworld*, for standing behind me on that. We followed up that action with a cover story in 1987 that identified more troubled vendors in the mail-order arena. Again, *Macworld* and our parent company, IDG, were left with substantial amounts owed us by these vendors. I'm proud to work for IDG, a publishing company that allows its magazines to bite the hands that feed them and to protect readers' best interests. I had never had that privilege in over eight years of journalism before coming to *Macworld*.

The tradition continues: Clockwise from left—Adrian Mello (editor-in-chief), Dennis McLeod (design director), and Charlie Barrett (managing editor).

Once there, I remember withstanding incredible pressure from many advertisers over the years—for favorable reviews, for retractions, for withdrawals, for apologies. And though we have made the small mistakes one might expect from a magazine that publishes information about thousands of products (including wrong addresses and wrong product versions), we have had very few grievous errors. A record I attribute to the hard work of editors, contributors, and one of the finest copy staffs extant (thanks to Kate Ulrich, Felicity O'Meara, Paul King, and Doreen Kan—you've saved us so many times I cannot recall them all).

At the same time, *Macworld* has received tremendous support from developers and advertisers. In particular I remember the support for our ELF-emission cover story and subsequent follow-up. Kieth Sorenson of RasterOps, Mike Boich of Radius, Mike McConnell of SuperMac Technology, and Thinh Tran of Sigma Designs deserve recognition for putting their dollars and products in support of consumers' best interests. Having worked with them on such a controversial issue, I gained a great deal of respect for their integrity. There *are* good guys out there.

We've had some notable fights on the traditional issues editors and journalists

continues

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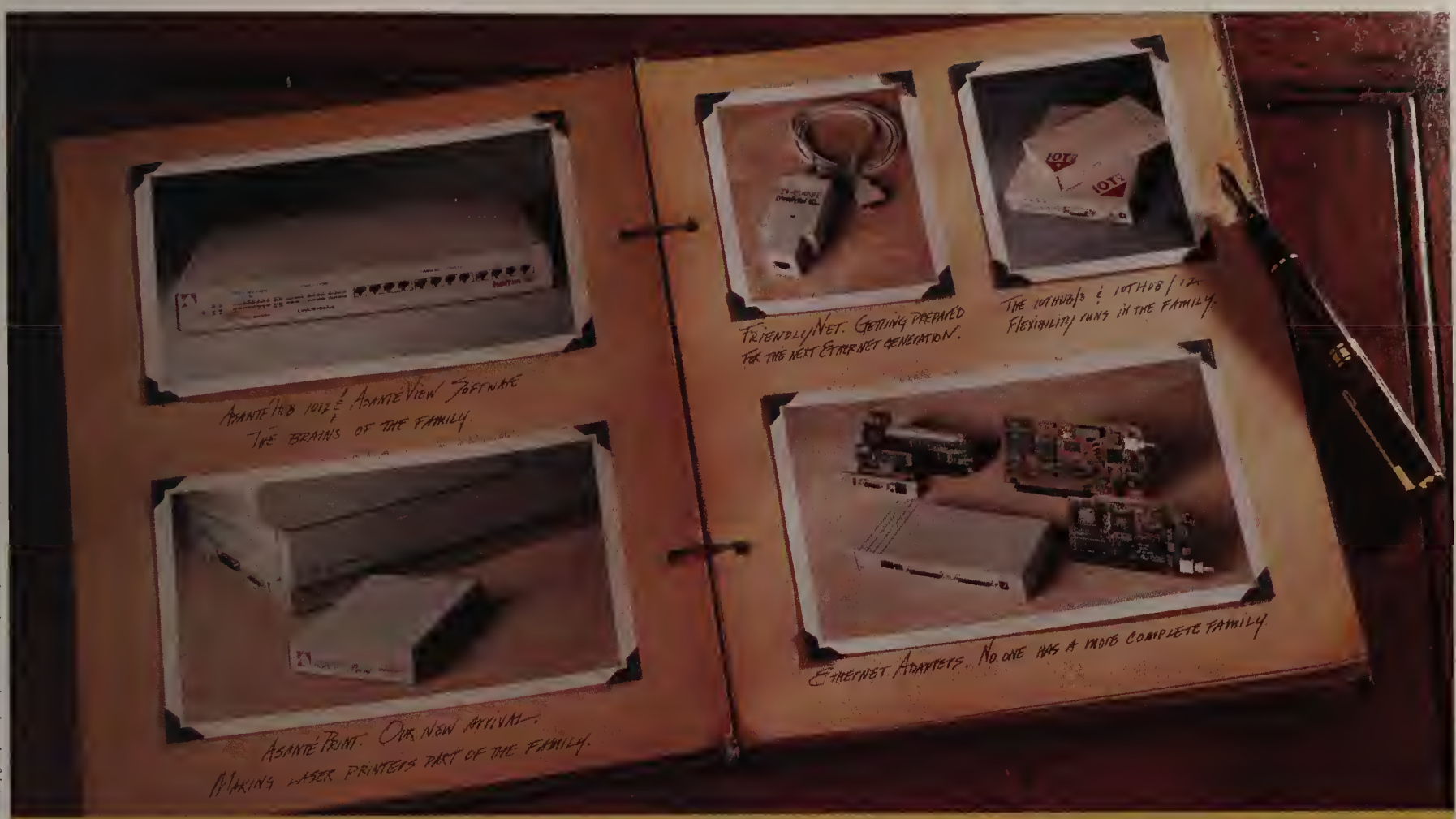

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MW EDITORS' CHOICE

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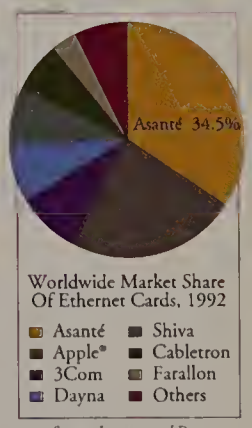

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face: copyright, trademark, libel, and others. My fondest memory in this regard is of going to court to defend the magazine on a First Amendment issue as a result of a column written by contributing editor Steven Levy. Our president and publisher, Jim Martin, stood solidly behind me as I marched into court to cite *Times* v. *Sullivan* to protect the freedom of the press. We won.

There were other threats—more bellicose, less realistic—by other advertisers and vendors. There was the last-minute threat of a temporary restraining order in federal district court by one advertiser determined to manipulate our publication. And numerous threats of litigation. All faced down, with no retractions or apologies issued, because we had done our work well and were prepared to stand our ground. I owe thanks to our legal representative, Bernard Burke, of the law firm Howard Rice Nemerovski Canady Robertson & Falk, for dozens of phone calls at odd hours in the heat of battle. Thanks, Bernie, for helping defend the Constitution, and for your patience; you make me want to stop taking potshots at lawyers.

Almost four years ago I nearly left *Macworld* to join Apple in order to publish a CD ROM–based magazine. I was inspired to that vision by Larry Tesler, then the VP of Apple's Advanced Technology Group and now vice president of the Newton Group. Instead I stayed at *Macworld* and am finally able to realize that vision with Macworld Interactive. Larry was the person who demonstrated the Xerox Star to Steve Jobs during Jobs's tour of Xerox PARC, giving him inspiration for the Macintosh. Larry is now guiding Apple's entry into the consumer market with personal digital assistants. And he's inspiring others with visions for the future.

Macworld Interactive: Issue One, Volume One. Electronic magazines start here.

Macworld Interactive: The first issue has Japanese and English versions.

The Sumeria team: Clockwise from upper left—Danny Lee, Donna Deuell, Claudia Smukler, Evan Cooper, Sandy Butler, and Jerry Borrell. Missing from the photo are Chip Carman and Matt Nielsen.

Two other Macintosh industry figures have been a source of inspiration to me over the years. Reese Jones, founder of Farallon, and Jean-Louis Gassée, now of Be Labs. It was at Reese's insistence that I moved toward establishing what are now workaday ISDN connections with our foreign publications. Jean-Louis, well, he was just an inspiration.

Looking Forward

I AM CURRENTLY WORKING ON MY next editorial, for Macworld Interactive. I recently found myself interviewing John Warnock, founder of Adobe Systems, talking about the future of electronic publications. But in contrast to earlier interviews, this time I carried a video camera. And in my next column (Macworld Interactive Fall, Issue 1, Volume 1) you'll actually hear John describe what he believes will happen. **m**

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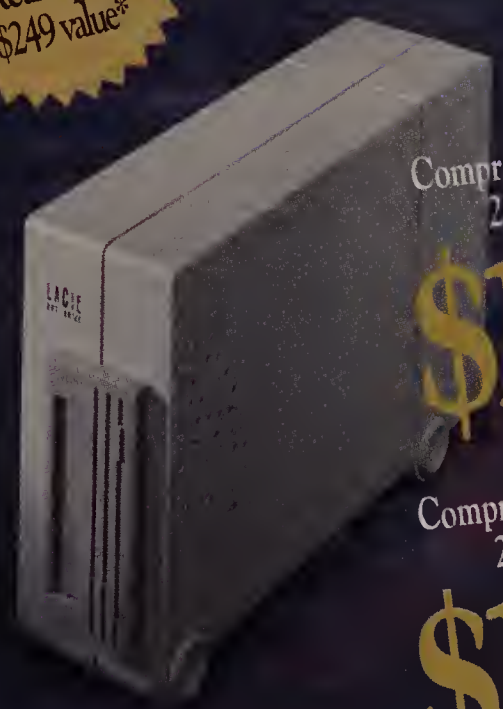

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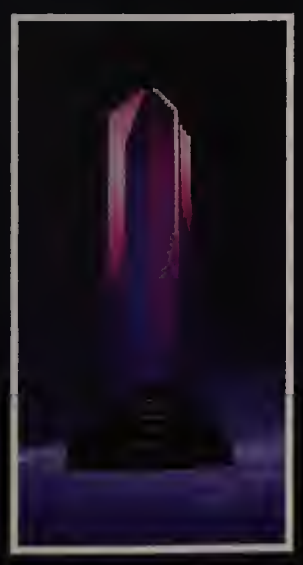
MacWeek, February 1991

The 1992 Macworld World Class Awards



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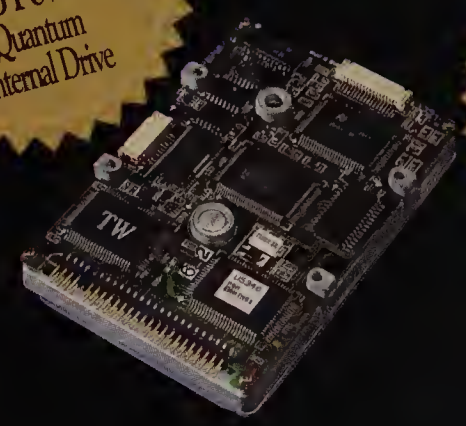

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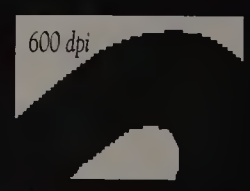
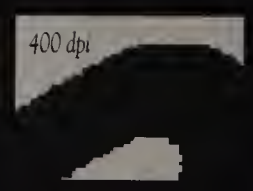


Microtek 600ZS



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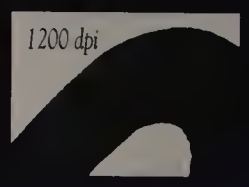

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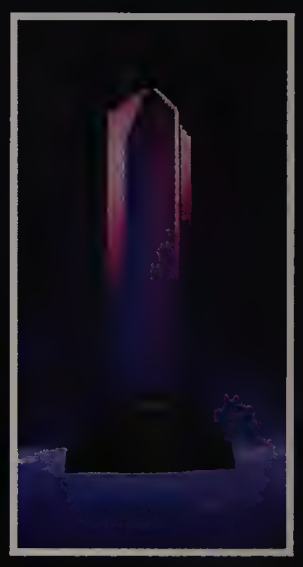

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Letters

NOVEMBER 1992

Angry at Ehman

I BELIEVE YOU WERE ENTIRELY TOO kind to Michael Ehman and his operations at Ehman, Inc. and now at Bridgette (*Conspicuous Consumer*, August 1992).

Michael Ehman is quoted as saying that "probably less than a couple of dozen" people were burned in his slick deal to close Ehman, Inc. That, of course, does not include the people of Wyoming, stuck with a state-guaranteed loan. Or his loyal employees who were dumped after they were used by him, as reported in your article. My guess is that you will hear from more than a couple of dozen who were/are unhappy with Ehman and his operation.

I regret that *Macworld* would even suggest Ehman deserves a fresh, new start, especially in a project he says he is not even involved in, so he can continue his practices at the expense of consumers who expect honorable treatment.

Kennett Allard
Fair Oaks, California

THANK YOU FOR YOUR IN-DEPTH article about the disgusting situation at Ehman, Inc. I think you have done your readers a great service. Keep up the good work.

L. D. Hunt
Seabrook, Texas

Cryptically Protected

I ENJOYED STEVEN LEVY'S ARTICLE on the battle between software vendors and the U.S. government over computer data encryption (*The Iconoclast*, August 1992). Privacy for everyone is an important ideal to strive for. One point Levy did not mention is that the current exportation restrictions may rob U.S. businesses of the chance to exploit our competitive lead in the potentially lucrative global encryption market. If we don't market encryption technology overseas, the Japanese and Europeans soon will, and both U.S. businesses and the National Security Agency will be losers.

Eric Samstad
Huntington Beach, California

I FOUND MR. LEVY'S ARTICLE ON electronic privacy interesting and alarming. It seems Big Brother is on his way . . . fast! I am interested to know of any groups that keep abreast of the situation, so I can keep up with the laws our government is trying to legislate regarding electronic privacy.

Timothy Parker
Sherman Oaks, California

Two groups concerned about matters of electronic privacy are Computer Professionals for Social Responsibility, 415/322-3778 or via internet (cpsr@csli.stanford.edu), and the Electronic Frontier Foundation, 617/864-0665.—Ed.

World-Class Woes

THE WORLD-CLASS AWARDS (August 1992) purport to reflect the relative quality of different products in each category on the basis of reader votes. I wonder how many voters actually compared two products in each category in which they voted. For example, in word processing software, Microsoft Word received 65 percent of the votes. No one who has actually compared the four heavy-duty word processors on the list can reasonably claim that Word is so grossly superior to FullWrite, Nisus, or WordPerfect. Rather, the results closely reflect the relative market shares of the various products. Those shares are influenced at least as much by advertising budgets and general conformity, masquerading under the banner of compatibility requirements, as by true indicators of quality. In fact, the software market is governed by a law that states that once a product receives a certain share of the market, it doesn't have to be good at all. It will succeed anyway, be-

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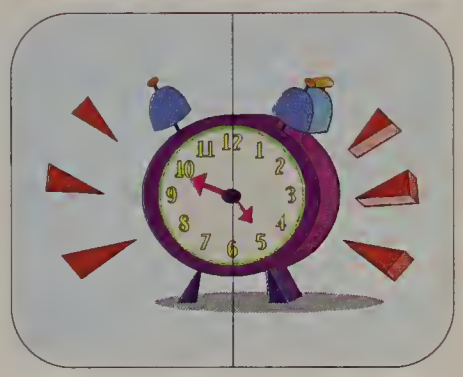

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Circle 80 on reader service card

CORRECTIONS

The Outbound Notebook System 2030S is certified by the U.S. Federal Communications Commission for home use (Reviews, *September 1992*).

The phone number to call for a new StyleWriter driver version 7.2 has been disconnected; users can now get the new driver from an Apple-authorized dealer (Reviews, *September 1992*).

MacLand offers a 105MB Quantum-based drive ("*Low-Capacity Hard Drives*," *August 1992*).

Christopher Latham Sholes designed the QWERTY layout (The Desktop Critic, *August 1992*).

The correct phone number for Security Concepts is 310/576-6279 (The Desktop Critic, *September 1992*).

cause it suddenly becomes necessary for new users to be just like everyone else.

In short, people vote for what they own, and what they own has little to do with how good a product is.

S. Rackovsky
Rochester, New York

Overprotected Typing Teacher

THANK YOU FOR DAVID POGUE'S ARTICLE on the bane of typing (*The Desktop Critic*, August 1992). I had started learning the Dvorak key map one week before reading this, and likewise recommend it. Two caveats, though: The author says he learned Dvorak in two days. So did I, but I hardly achieved my QWERTY words per minute in that time. I type around 75 words per minute on the QWERTY key map and—so far—20 on Dvorak. It's agony to be so slow, but there's a lot of sunlight at the end of the (carpal) tunnel.

Also, I agree that Mavis Beacon Teaches Typing is a fine program, but why in the world did they have to key-disk copy-protect it, and—more to the point here—why did your article give no warning about this? The key-disk scheme is dangerous, intrusive, and odious.

John Rethorst
Ithaca, New York

Software Toolworks reports that version 2.0 of Mavis Beacon Teaches Typing, due this fall, will work with Adobe Type Manager and won't be copy-protected. David Pogue adds that after only two days typing on a Dvorak layout, he hadn't matched his QWERTY typing speed either.—Ed.

continues

PRODUCT TESTING AND LATE NIGHTS AT THE LAB: PART THREE

In his July and August *Commentary* Jerry Borrell asked for readers' opinions on *Macworld*'s product testing. Here's what you've said.—Ed.

WHAT DO I LOOK FOR IN THE PRODUCT reviews? Perhaps surprisingly, I do not look for a definitive answer. I cannot realistically expect any magazine to evaluate and select a product fit for my particular needs or perceived values.

I do want *Macworld* to identify my alternatives; provide quantitative performance comparisons; objectively evaluate product quality; list the manufacturers' price for the products; and identify, for comparison purposes, vendor support levels, upgrade policy, and warranty.

Larry Jacobs
Plano, Texas

COMPARATIVE REVIEW FEATURES are overly elaborate for most folks—they aren't hot to switch, they aren't hot to upgrade. They just want to know what's new and whether it works.

No one wants to wait a year to see if a drive's good. Face the situation your readers face and test the new stuff as well as you intelligently can. Forget about a year from now.

Try to bring up more warts in reviews of new products. Too often, I read a year later that "of course this program never did that well." This comes up after I've bought the product and discovered this on my own.

John Sweeney
Seattle, Washington

THERE IS A FOOLISH CONSISTENCY to the magazine's reviews. Most speak positively about the product and say little about the shortcomings the reviewer may have noted. If you took a poll of your longtime subscribers, my guess is that you would find that what they consider most important are the *News* and *New Products* listings, followed by comparative reviews of hardware. I would be surprised if any of them found much use for your superficial software reviews.

Steven Baird
Baton Rouge, Louisiana

I HAVE BEEN A READER OF *Macworld* for only six months as I only recently purchased a Macintosh LC, yet I find the product-testing articles in each issue the most interesting and informative. However, these articles would be more useful to me if at least some of them dealt with an explanation of the myriad specifications, formats, and so on, of the equipment reported on. In many cases, the authors use terms that only a computer expert would understand. In other words, I would like to see articles that would assist the new owner or computer hardware neophyte raise his level of understanding and comprehension so that new technologies and approaches could be better understood.

Leon F. King, Jr.
Summerville, South Carolina

I WAS TAKEN ABACK WHEN YOU wrote that you are "attempting to replace the vast feature charts with narrative summaries of products' strengths." The worst direction you could take would be a return to your review format of several years past, which often consisted of a disorganized, stream-of-consciousness prose style that was not only impenetrable but lacking in "hard" information.

One prime clue to whether an item makes a valid comparison-chart row is the number of footnotes it takes to explain it. If the row has more than one footnote in it, it obviously needs a paragraph of meaningful explanation outside the chart format. You may not need to refer to the matter in the chart at all. If you clearly state your criteria for inclusion, there is no reason why the chart must cover every single aspect of all the combined products.

Jeff Frkonja
Seattle, Washington

YOUR PRODUCT-TESTING REPORTS, as fine as they are, still do not address or solve a vexing problem: the independence of the source of information. What critical information may be withheld or distorted, unconsciously or otherwise, if an advertiser's ox is about to be gored? Have you been able to build a Chinese wall between your ad-

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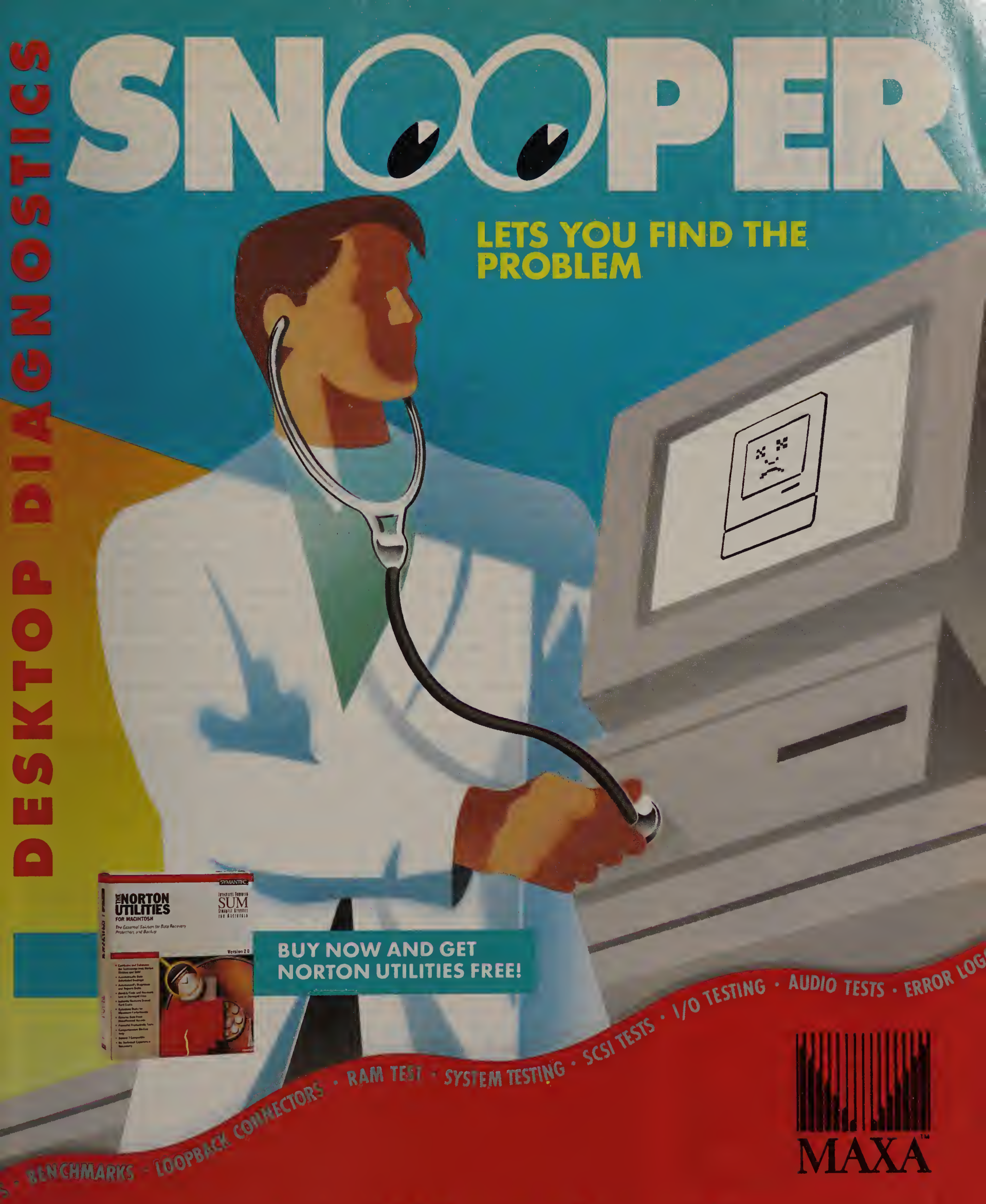

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PRODUCT TESTING (CONTINUED)

vertising department and your engineers in the Lab, or somehow render the maxim "No man shall serve two masters" inoperable? As a Scotchman said, "I ha' me doots."

I read your reports over lunch, but take them with a grain of salt.

John Hayden
Warren, Michigan

I HAVE ALWAYS FOUND YOUR REviews useful; however, they share a significant weakness with every other computer magazine's reviews: they say little about the performance relationships between hardware and software. It is not enough to know whether a new Macintosh can run software that you own without crashing. It is not enough to know that Program A runs on Mac Model B with four megs and a hard disk. For many of us performance is an important issue. Software that merely crawls along at certain RAM levels is not worth the purchase.

On matters of performance, who are we to believe? The salesman? The manufacturer? Your *Commentary* explains why computer magazine reviews are not like automotive magazine reviews, but you sidestep the fundamental question of their reason for being. Without magazine reviews we lose an impartial player.

As your article explained, testing is expensive, even for small machines. But if publishing budgets are tight, believe me, these days, internal systems testing budgets are tighter still. Clearly, the cost of large-scale personal testing is very nearly impossible. We need you.

Steven Edelstein
New York, New York

I, FOR ONE, AM MORE INTERESTED in knowing whether a new monitor or hard disk will last for some time than in knowing whether its maximum brightness is a bit better than that of its competitors. One can start by realizing that reliability in a product does not appear by chance, but comes only as a result of painstaking care and discipline in design and in manufacturing. Thus, a company's track record is not liable to change overnight. It would be appropriate for *Macworld* to include in its reviews of hardware what a manufacturer does to ensure reliability. Some examples: Is there a quality-control department? Does the company routinely test samples of its products for extended life? What is the company's policy toward purchased components? Does the company have an approved list of suppliers?

Last but not least, *Macworld* could survey its readers, along the lines of *Consumer Reports*, to find out what their experience with individual products has been. Publishing the results of reader-satisfaction surveys would not only prompt manufacturers to clean up their act, but would also go a long way toward alerting readers as to what products are liable to cause problems.

Carlo Infante
Westford, Massachusetts

I MAKE EXTENSIVE USE OF PRODUCT testing info before making any software or hardware purchase because I want the best product for my needs, I want the best value for my money, and I want to avoid being burned by a poor product. I don't need long-term data, so its absence will not affect me.

I want the tester's recommendations, but I still want the measurement/feature charts so that I can make the final, intelligent, based-upon-my-needs decision.

Robert Kuhn
Exton, Pennsylvania

WITH DISK DRIVES OR CPUS, THE current method of testing and the presentation of results are generally sufficiently informative to allow a good purchasing choice, but when dealing with monitors and printers, translating either the subjective observations or the test data into a short list without actually showing how well these visual devices perform is problematic. I urge you to use photographs of the screens themselves and examples of the printed output in your reviews so that we can observe directly the characteristics of each device.

For all reviews, I would bias the analysis toward issues of direct consequence to the user. I concur that long-term testing is unrealistic for *Macworld* to pursue and that the market will in any case sort the good from the bad very quickly.

In conclusion, I find *Macworld*'s tests among the most balanced and informative available. I would hate to be without them.

Joel M. Sciamma
Surrey, England

The More Tracks, the Better

I DON'T UNDERSTAND. JIM HEID writes "PageMaker sports the best tracking features of any publishing program, offering five tracking commands ranging from Very Loose to Very Tight," and "QuarkXPress offers just one track—though it is customizable" (*Getting Started*, August 1992).

Because QuarkXPress's tracking features are customizable, you can make as many as you want with the Edit H&Js command. Furthermore, if you make them when no document is open, you only have to make them once—they'll be there until you change them.

Jim Alley
Savannah, Georgia

DataClub Doesn't Deliver

YOU DID A GREAT DISSERVICE TO your readers with your cursory review of DataClub Classic and DataClub Elite (*Reviews*, August 1992). It is true that DataClub makes file sharing transparent to the user, but its implementation and support leave much to be desired.

We have used DataClub Classic on a small network for almost two years and have found two very serious bugs in the program. It loses the graphic links in QuarkXPress documents when they are shared across the network. The bug was vehemently denied by DataClub technical support until a number of users showed them how to duplicate it for themselves.

Second, and even more serious, DataClub has a nasty habit of randomly creating an unnamed folder on the network. When a user attempts to delete this folder, it trashes the entire network. This bug has also been reported by a number of users to DataClub, to no avail.

We can only hope that with the backing of Novell, the new owner, DataClub will clean up the program and improve the support.

Greg Madsen
Appleton, Wisconsin

Chill Out on System 7

MAYBE YOU SHOULD START A SPECIAL section in your magazine entitled "Whining about System 7" for all the people who write you letters every month complaining about System 7 (*Letters*, August 1992). I am so tired of hearing "System 7 is not good because it's not compatible with my four-year-old copy of Word," "I had to buy more memory," or "System 7 made my Mac Plus slow down and there isn't enough memory anymore." So go back to System 6, or 4.2, and stop whining.

John Mardesich
San Anselmo, California

Companies Respond

CHARLES SEITER REMARKS THAT 1-2-3 for Macintosh uses the same "cryptic" macro language as the DOS versions of 1-2-3 ("Spreadsheets That Count," July 1992). The native macro language is based on an English-like command set, such as {Edit-Paste} or {Insert-Rows}. The set of commands to which Mr. Seiter refers is a subset of the whole, and is there primarily for users who need to maintain macro compatibility with 1-2-3 on DOS or other platforms.

Second, he erroneously states that 1-2-3 for Macintosh has no worksheet macro buttons. They are indeed in the product, activated by clicking on a button on the draw tools palette.

Yuko Takagi
Product Manager, Lotus 1-2-3 for Macintosh,
Lotus Development Corporation
Cambridge, Massachusetts

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THE REVIEWER TRIED TO FIT LinksWare, a totally new concept, into the old mold of HyperCard (*Reviews*, August 1992). For example, in LinksWare retrieving a link is not done through a list, although that is an option, but is done simply by clicking on the linked word in the body of the text. The user is not required to look through "all linked words in all documents" as the review states. Additionally, to return to a linked word, simply click on the window, as in all Mac applications. LinksWare has no need of go-back buttons or paths to return to the source of a link, as does HyperCard, since LinksWare uses multiple windows on a standard desktop.

LinksWare can link many words in many different documents to the same file. If you remember that you linked a word, but cannot remember where, you select the word list. Clicking on the word produces a second list containing all the files in which that word was linked. You may then click on one of those files to open it.

Tracy Valleau
President, LinksWare Corporation
Pacific Grove, California

MACWORLD'S REVIEWER MADE A series of technical mistakes while reviewing the Notebook Display Adapter 030 (*Reviews*, September 1992)

The review stated that our software "isn't smart enough" to detect whether or not a display is connected. This is wrong; not only does the software recognize that a display is attached, it also powers down the adapter if no display is connected. It was also stated that our board had trouble with the monitors that were tested. This is because the reviewer did not use the Control Panel to select the monitors. The reviewer also mounted the connector assembly upside down (he did not go to a dealer as we require).

The article stated, "Because the board uses the PowerBook's memory-expansion slot, you can't upgrade your PowerBook's memory." Again, this is wrong. Our 0, 2, and 4MB adapters have a pass-through memory port which accepts Apple's 2MB memory upgrade. If users want even more memory, they can send us their adapter and we'll install additional RAM chips.

The reviewer also noted that our adapter for the PowerBook 100 does not support color. That's because the PowerBook 100 is a monochrome machine.

I'd also like to point out that the "smoking PowerBook" was in fact a component on our board (not the PowerBook) which came into contact with the metal backing on the keyboard. We encountered this problem in a small number of initial production units and have since fixed the problem.

Envisio has shipped over 6000 Notebook Display Adapter 030s to users who are happy with our solution of providing video-out capabilities for the PowerBooks. I'm sorry we can't include *Macworld* among them.

Thomas Burke
President/CEO, Envisio
Minneapolis, Minnesota

The adapters we tested didn't detect whether or not the display was connected. The board was installed by an Apple-authorized dealer. The article did state that the only way you can add memory (if you have more than 2MB already in the PowerBook) is to purchase it from Envisio.—Ed. m

Letters should be sent to *Letters, Macworld*, 501 Second St., San Francisco, CA 94107, or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1). Include return address and daytime phone number. We regret that due to the high volume of mail received, we are unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*.

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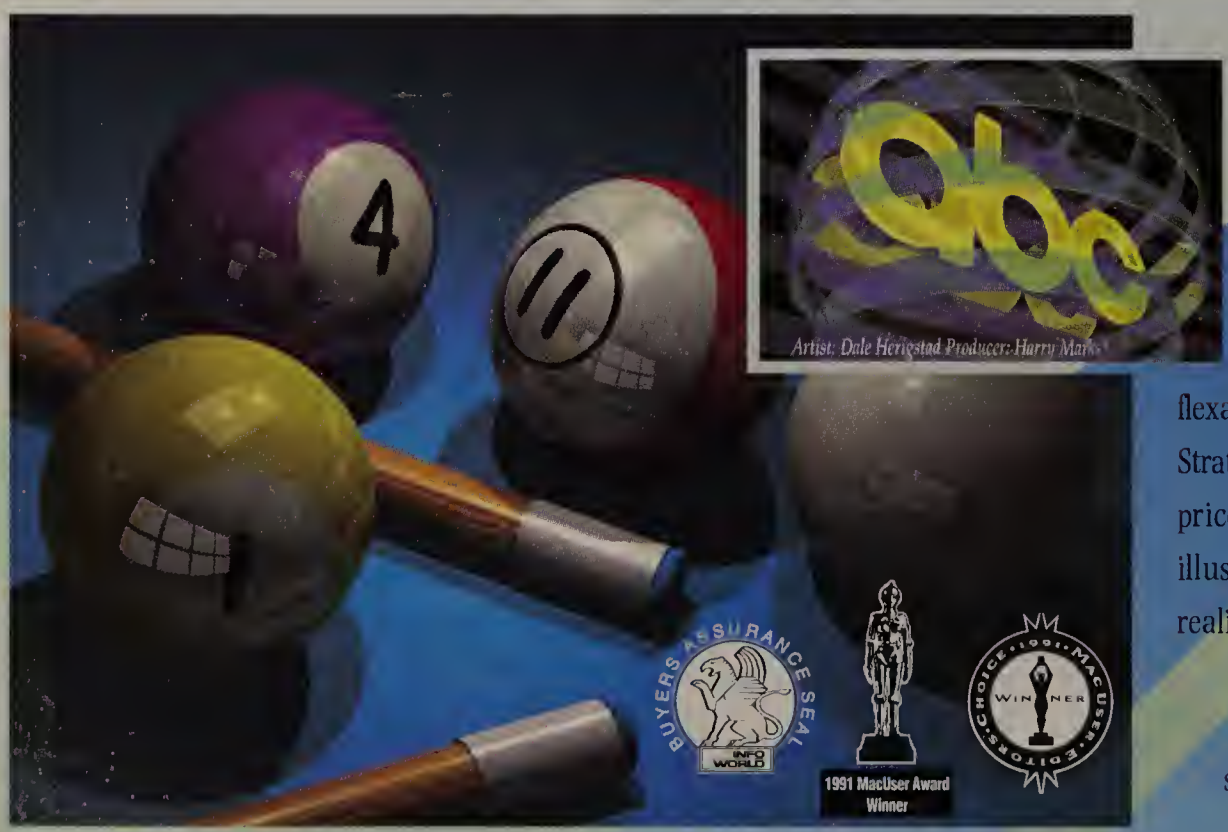

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A Suit in Time

BY STEVEN LEVY

IN 1989, SHELDON BREINER HAD a good idea. He knew that the computer workstation market was growing steadily. It was clear that the users of those machines, which run on powerful RISC (reduced instruction set computing) microprocessors, would appreciate a wider range of software applications than the meager selection available for the Unix operating systems employed on workstations. Breiner also knew that the best ensemble of software applications going were those written for the Macintosh. Why not, he figured, create software that would allow Macintosh programs to run on the RISC workstations of Sun, Apollo, Silicon Graphics, and IBM?

When a good idea arrives in the head of most people, they have a tendency to congratulate themselves, vow to implement it, and soon forget about it. But Sheldon Breiner, as Apple Computer was destined to find out, is not your average person. He has conscientiously packed a lot of experience into his 55 years. After earning a doctorate in geophysics at Stanford, he focused his efforts on unearthing such mysteries as knowledge concerning upcoming earthquakes, sunken nuclear submarines, human beings buried in avalanches, and an imposing sculpture of the Rain God worshiped by the lost civilization of the ancient Olmec people.

Not long after finding the Rain God, Breiner applied his skills to the world of business, founding a company called GeoMetrics; its specialty was locating oil and minerals. When Breiner sold the company, he became a rich man. Later he founded other companies, including a not-terribly-successful artificial intelligence concern. No matter. A longtime resident of Silicon Valley, Breiner knew that lightning could strike at least twice. In 1989 he formed Quorum, a software company dedicated to moving Macintosh applications to other computers—whether Apple Computer wanted them there or not.

Breiner likes risks—he is a seismologist who built a home only yards from the San Andreas Fault. But he also is a person who knows how to minimize those risks—the foundation of that same house is fortified by massive reinforced concrete piers. In starting his new company he knew he was taking another risk: Apple Computer might try to stop his venture, even though he believed that he was doing Apple, and particularly its developers, a favor by expanding the domain of the Macintosh.

So even before Quorum began its design work, Breiner retained not one but two law firms specializing in intellectual property. Then, when it came to choosing the designated genius who would turn Breiner's idea into the peculiar reality that is software, he had to find someone who was a certified computer wizard yet had never as much as crossed the Cupertino city limits—a total blank slate concerning Apple's proprietary codes and techniques. He found his man in Martin Chavez, 26, a Harvard B.A. and Stanford Ph.D. who had already founded a high-tech firm and in his spare time had completed four years of medical school.

In 1990, Chavez had a crucial breakthrough. When applications running on the Macintosh go about their business, they send out digital requests from the Macintosh Operating System to make certain things happen—dialog boxes appear, files are saved, and so on. Chavez figured out how to interpret those commands to make the same things happen in the Unix operating system of RISC workstations. This scheme, dubbed the Quorum Compatibility Engine, required no use of Apple's much-protected proprietary technology. For instance, when a Mac application asks for something to be drawn on the screen, it requests the Mac Operating System to use Apple's patented QuickDraw algorithms to produce the images. The Compatibility Engine plugs that request into the PostScript-based display system already implemented in workstations—and the screen shows the intended image, without raiding Apple's Toolbox. The Quorum lawyers saw the Compatibility Engine, and said it was good.

How a little guy called Apple's big bluff

Plans were made to use the Engine in two products. The first was Latitude, which would enable Macintosh developers to easily adapt their applications to run on workstations. The second was Equal, which would allow Mac applications to be run on Unix workstations out of the box. Breiner envisioned implementing the same principles used in Latitude and Equal in a series of other products that would allow any software to run on any computer. For Breiner, this situation would be nirvana, a multispoked wheel of compatibility in which all spokes are connected to Quorum.

Letters, They Get Letters

ASSURED BY HIS ATTORNEYS THAT HE was violating no copyright, Breiner initiated discussions with Apple executives in October 1990. He even hoped that Apple would itself license his company's technology. Eventually, over 50 executives at Apple, including John Sculley, viewed early versions of Quorum products. In January 1992, when Quorum publicly announced its products, scheduled to ship later in the year, Breiner felt good about his relationship with Apple. When Apple requested an alpha release of the software so Apple's engineers could examine it, Breiner felt it might be a prelude to a deal.

Then came an odd letter from Apple VP Roger Heinen. Dated February 6, 1992, the letter requested that Quorum send the complete code of Latitude to Apple's lawyers. On Valentine's Day, Breiner responded with a 24-page white paper detailing how Latitude was developed, emphasizing that Quorum's engineers had no access to Apple's proprietary code. And he agreed to allow Apple to examine some of Latitude's code.

On March 17, Heinen sent another letter, this one to a Quorum attorney, charging that "Latitude appears to specifically infringe Apple's patents and copyrights. This is evident from a cursory review." The letter continued to say that although the other Quorum product, Equal, was in too nascent a form to evaluate, Apple was convinced that if the product worked, it would do so only by violating Apple's intellectual-property rights.

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Heinen's letter concluded with a dark suggestion that Apple and Quorum meet to see "how Quorum proposed to remedy the various legal issues raised by these products."

Quorum's lawyers were glum—"Apple's going to sue you," they told Breiner. Even if Apple did not sue, the letter was a potential death warrant for Quorum. The young company, already in the hole to venture capitalists for over a million dollars, was about to seek new funding. It would be illegal to contact investors or potential customers without notifying them of this letter. What sort of idiot would invest in a company seemingly about to be stomped by a giant?

Breiner, ever the optimist, wondered if there was still room for negotiation. But no one at Apple would return his calls. Everyone referred him to "legal." Then on May 1, Quorum received a letter from Apple's Developer Program. Although Quorum had been a certified Apple Developer for over a year, the letter cited that "your application this year was approved in error." It explained that "the program is designed to facilitate the development of products which run on the Macintosh. Neither Equal nor Latitude fit this description." Therefore, the letter said, Apple was revoking Quorum's status as a developer. Breiner had already paid to attend the Apple Developers Conference later that month. But when he showed up at the conference, the folks at Apple barred his entry.

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So Sue

ALL IN ALL, THIS SEEMED TO FIT THE pattern of Apple's behavior when the slightest hint of an intellectual-property-rights issue arises: a knee-jerk tendency to threaten and to litigate. It seemed that as far as Apple was concerned, the proper response would be for Quorum to roll over and die.

But Quorum did not die. You will recall that Breiner's business, like his earthquake-resistant house, had been bolstered by prophylactic measures. He knew that Latitude did not infringe on Apple's QuickDraw, because it did not use QuickDraw—it used the Display PostScript already on the workstations. The code was totally clean. Apparently the engineering talent at Apple had not been able either to discern this or to convey this to the executives in charge of writing threatening letters. So Breiner and Quorum decided to speak to Apple in the one language in which the company seemed conversant. They sued.

The litigation, filed on May 11, was officially a request for a declaratory judgment that Quorum's products did not violate Apple's intellectual-property rights. But longtime watchers of Apple's liberal use of litigation to achieve its ends saw it for what it was: a rock in David's slingshot. And just as a single rock felled Goliath, this single piece of paper not only changed Apple's attitude, but also ensured there would be no changes in Latitude.

Apple's attorneys began negotiations for a settlement of the suit within hours of the filing. Within two months an agreement was indeed signed. Its contents, alas, are confidential. (Quorum is permitted to show the agreement to potential business partners.) But Quorum's understated press release speaks volumes: "Quorum will continue to develop and market its cross-platform compatibility products without threat of legal action from Apple. Additionally, Quorum will be reinstated in the Apple Certified Developer program with full privileges." In other words—David 1, Goliath 0.

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A Moment in Time

THERE ARE CERTAIN MOMENTS IN HISTORY that indicate a significant about-face in the policy of a nation or institution. Those of us who watch Apple hope that the Quorum settlement marks such a sea change. For years we have been watching Apple harass both competitor and ally. The technology-driven company whose products we adore seemed obsessed with litigation. No longer an underdog, Apple had become the bully of the valley.

Needless to say, this attitude did nothing to enhance Apple's popularity. But ironically, the biggest victim of this aggressive legal strategy was Apple itself. As explained by G. Gervaise Davis III, a Silicon Valley lawyer, "People may say a suit is well and good, but how much time does it take from executives? They might be tied up for three weeks of testimony." Apple has just undergone a tediously long and drawn-out battle with Microsoft over whether or not Gates and company violated Apple's rights, a fight that at press time looks to be a total loss. Who knows how many days of decision-making time has been lost in stuffy deposition rooms? Who knows how many hours of pricey legal talent has been billed to Apple and its shareholders?

Ultimately, the price of blind litigation is credibility. In this case, Apple revoked Quorum's developer status, claiming that the reason was that Quorum doesn't make applications that run on the Mac. But as explained to me by Kirk Loevner, vice president of Apple's developer group, this is not at all a criterion for exclusion from Apple's fold. "Apple is very supportive of companies that create opportunities for developers," he says. "Lots of companies whose products aren't specifically Macintosh-based are welcome." Loevner says that Apple's objection to Quorum was "not their business, but the way they went about it." Loevner told me that unlike during the dark days at Apple, when the company discouraged any Mac developer who considered porting an application to Windows, Apple now *welcomed* the kinds of cross-platform schemes that Quorum promoted. (He noted that, in conjunction with Symantec, Apple was even involved in such a scheme, codenamed Bedrock.)

Was Apple's reaction to Quorum a blunder then? The company will not answer the question, but its behavior certainly begs for explanation. If Apple did not believe that Quorum really infringed on its rights, why did an official write a letter charging just that? A letter that, if unchallenged, would have become a death warrant for Quorum? And if Apple *did* in fact believe Quorum's products truly infringed upon Apple's intellectual-property rights, why did the company instantly settle the case?

Here's a rosy scenario: Apple is finally willing to draw its age of litigation to a close. "The settlement is a constructive sign," says Gervaise Davis. "I think [Apple] management is getting tired of paying legal fees." Let us hope that this is so. And let us also honor Sheldon Breiner. Though his company's actions were purely in the interests of its own survival, the impact of its suit is reminiscent of that of the man who looked Senator Joseph McCarthy in the eye and said, "Sir, have you no shame?"

History records that the vile McCarthy looked away. And let it be noted that when Quorum sued, Apple blinked. In both cases, it was time for new thinking to carry the day. **m**

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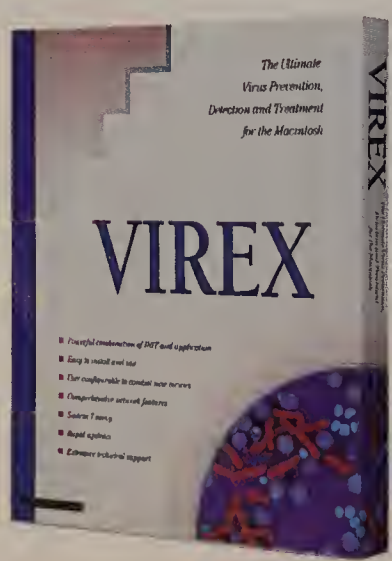

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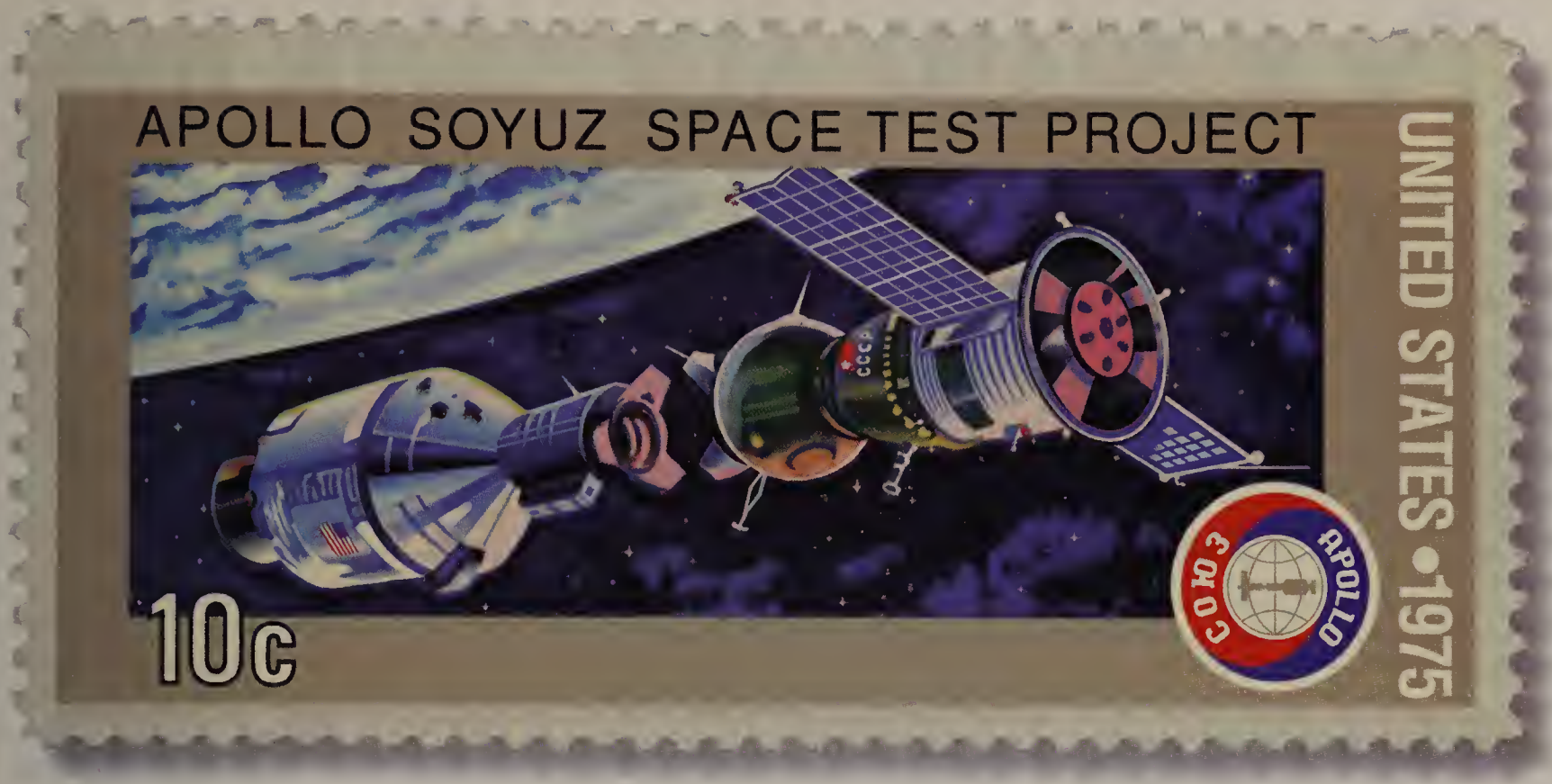

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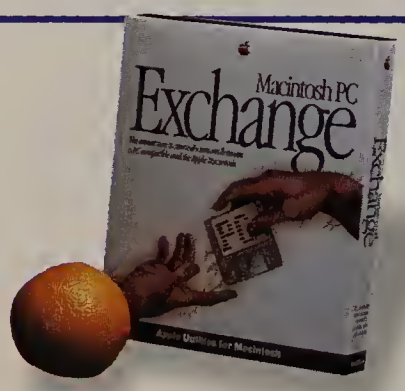

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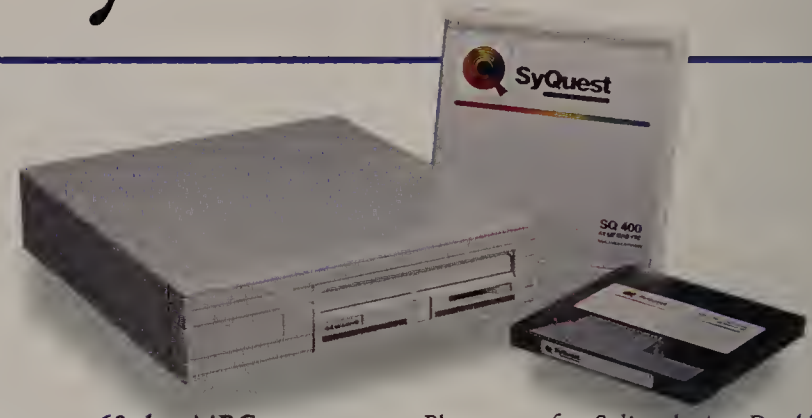

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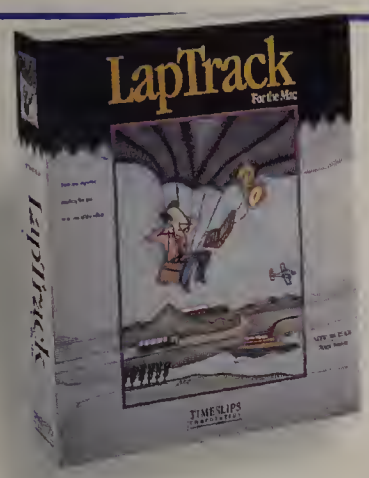
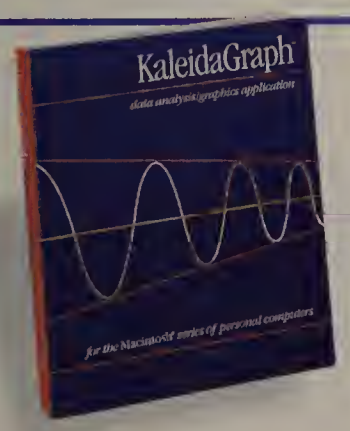


★TIMESLIPS ... 30 day MBG
1701 ❼*LapTrack for the Mac*—Record time and expenses more easily than ever before—whether in the office or in the field using a PowerBook..... **$52.**

★Business Sense, Inc. ... 30 day MBG
3555 ❼Business Sense 1.6..... 124.
★CheckMark Software ... 60 day MBG
5863 ❼MultiLedger. 225. 3767 Multi-User . 419.
5862 ❼Payroll 4.6..... 169.
★Chena Software ... 30 day MBG
1594 ❼Fair Witness 1.2..... 185.
★Claris ... 30 day MBG
1129 ❼MacWrite II 1.1V2..... 89.
3903 ❼ClarisWorks 1.0V2 199. 3743 ❼Upgrade 95.
3531 ❼Claris Resolve 125. 3745 ❼Upgrade 95.
8216 ❼FileMaker Pro 2.0 268. 4752 ❼Upgrd. 99.
1745 ❼MacProject Pro *(Oct. '92)*..... 409.
★Essential Software ... 30 day MBG
4086 ❼Easy Alarms 2.0..... 61.
★Expert Software ... 30 day MBG
5234 ❼Expert Writer 1.0..... 29.
★ExperVision ... 30 day MBG
7486 ❼TypeReader 499. 7486 Compact Upgrd. 149.
★Good Software ... 30 day MBG
2527 ❼REMS Property Manager ..... 399.



★Synergy ... 30 day MBG
6617 ❼*KaleidaGraph 2.1.3*—Data analysis and presentation tool. Lets you enter or import data, run sophisticated analysis, and then create scientific or business graphics using any of 16 plot types..... **$149.**

Helix Technologies
5796 ❼Double Helix 3.5.9..... $299.
★Intuit ... 30 day MBG
2507 ❼Quicken 3.0..... 42.
JAM Software
6089 ❼Smart Alarms Plus..... 45.
★Kaetron Software ... 30 day MBG
8941 ❼TopDown 3.1 199. 6317 Upgrade 129.
★Lotus Development ... 30 day MBG
3606 ❼1-2-3 for Mac.. 329. 3604 Upgrade . 95.
★MECA ... 60 day MBG
2796 ❼Managing Your Money *limited special* 32.
★Microlytics ... 60 day MBG
6461 ❼WordFinder Plus 4.02..... 39.
7820 ❼Random House Encyclopedia 1.0 ..... 68.
★Microsoft ... 30 day MBG
2884 ❼Works 3.0 *(Sept.)* 155. 8173 ❼Upgrd. 79.
3669 ❼Excel 4.0... 295. 5237 ❼Upgrade .... 95.
4902 ❼Word 5.0... 295. 1503 ❼Upgrade .. 125.
5454 ❼The Microsoft Office 2.5 ..... 475.
★Niles & Associates ... 30 day MBG
4602 ❼EndNote 1.5.. 85. 8010 ❼Plus 1.2.. 145.
Nisus Software
5683 ❼Nisus 3.06 238. 1612 ❼Compact 3.3 92.
★Nolo Press ... 30 day MBG
4228 ❼Personal RecordKeeper 3.0..... 30.
2981 ❼WillMaker 4.0 *(not valid in LA.)*..... 35.
1204 ❼Living Trust 1.0 *(not valid in LA.)*..... 45.
★OCCAM Research Corp. ... 60 day MBG
3697 ❼MUSE 1.01..... 469.
★Palo Alto Software ... 60 day MBG
6932 ❼Employee Handbook Toolkit 5.2..... 65.
6975 ❼Business Plan Toolkit 4.0..... 75.
★Pastel Development ... 30 day MBG
1785 ❼DayMaker 2.0 *(Oct.)* 79. 1011 *(network)* 92.
★Portfolio Systems ... 30 day MBG
7992 ❼DynoPage 1.7 or 6916 ❼Dynodex. *ea.* 49.
★PowerUp ... 30 day MBG
7696 ❼Calendar Creator 2.0..... 44.
★ProVUE ... 60 day MBG
4582 ❼Panorama II 2.0.6..... 239.
★Reality Technologies ... 30 day MBG
6929 ❼WealthBuilder 1.02..... 95.
★Reference Software ... 30 day MBG
6268 ❼Grammatik Mac 2.0..... 39.
Round Lake Publishing
❼LetterWorks, SALES or LEGAL .... *ea.* 45.
★Shana Corporation ... 30 day MBG
7692 ❼Informed Designer 159. 8810 In. Mgr. 99.
★SoftSync, Inc. ... 30 day MBG
7129 ❼Accountant, Inc. 335. 3828 MultiUser 569.
Spyglass, Inc.
2027 ❼Transform 2.1..... 399.
★Symantec ... 30 day MBG
2237 ❼GreatWorks 2.0 129. 2278 ❼Upgrd. 89.
3422 ❼More 3.1..... 265.
★Synergy ... 30 day MBG
6617 ❼KaleidaGraph 2.1.3..... 149.
★Teleware ... 30 day MBG
7616 ❼M.Y.O.B. 3.0..... 138.
★TIMESLIPS ... 30 day MBG
1701 ❼LapTrack for the Mac..... 52.
2986 ❼Timeslips III 2.1..... 194.
★T/Maker ... 30 day MBG
1858 ❼FaxMania *(birthdays to bulletins)*..... 25.
3639 ❼WriteNow 3.0 149. 5259 ❼Upgrade 49.
5253 ❼WriteNow 3.0 Competitive Upgrade ... 69.
★Vertical Solutions ... 60 day MBG
5886 ❼FastLabel 3.1.6..... 44.
★WordPerfect ... 60 day MBG
3800 ❼WordPerfect 2.1 279. 4711 Upgrade 89.

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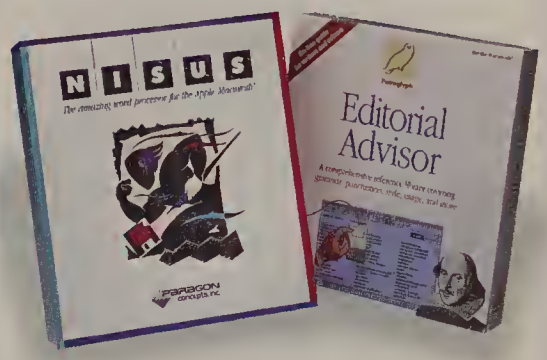
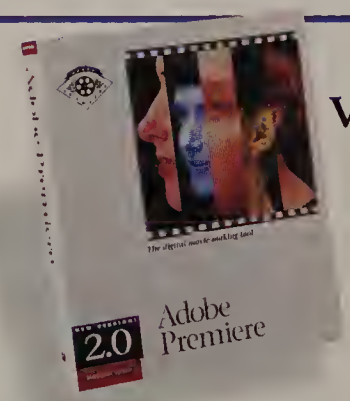


Nisus Software
5683 ❼*Nisus 3.06*—Serious word processing power with unlimited undos, noncontiguous selection, page layout & drawing tools, macros, & style sheets. Incl. free Editoral Advisor, a reference library in grammar, style, & usage ..... **$238.**

★Wordstar ... 30 day MBG
6984 ❼Correct Grammar 3.01..... 55.
3554 ❼American Heritage Dictionary 1.0..... 55.
★Working Software ... 60 day MBG
5896 ❼Last Resort 38. 3792 ❼Spellswell 2.2 44.

GRAPHICS & DESIGN
PUBLISHING, PRESENTATIONS

★Abracadata, Ltd. ... 30 day MBG
9990 ❼Design Your Own Home - Architecture, 9992 Interiors or 9994 Landscape... *ea.* 48.
Adobe Systems
❼Adobe Type Sets for Business .... *ea.* 95.
❼Adobe Type Library *(Vol. 1-308)*..... call
6957 ❼Adobe Type Reunion 1.0.2..... 41.
5750 ❼Adobe Type Manager 2.0.3..... 59.
6053 ❼Plus Pack 2.0 118. 6098 ❼TypeAlign 61.
4145 ❼Adobe Premiere 2.0 *(Sept. '92)*..... 429.
8171 ❼Adobe Illustrator 3.2 *(with ATM)*..... 368.
5001 ❼Streamline 119. 6644 ❼Photoshop 548.



New Version 2.0

Adobe Systems
4145 ❼*Adobe Premiere 2.0*—Combines video footage, audio recordings, animation, still images & graphics to create high-quality digital movies. Motion control, Film Strip file, PostScript rasterizer & more are new with 2.0 ..... **$429.**

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2461 ❼Aldus Gallery Effects 1.0 ..... 128.
3506 ❼SuperPaint 129. 3507 ❼Super 3D.. 325.
4751 ❼Persuasion 325. 1330 ❼FreeHand. 394.
7088 ❼PageMaker 494. 7541 ❼IntelliDraw 199.
Altsys
1983 ❼EPS Exchange 2.0 ..... 89.
1195 ❼Fontographer 3.5 ..... 258.
★**Ares Software ... 30 day MBG**
8878 ❼FontMonger 1.5 *(Sept. '92)*..... 93.
★**Baseline Publishing ... 30 day MBG**
8055 ❼Screenshot 1.2 ..... 34.
Broderbund Software
3572 ❼Kid Pix 1.2.. 34. 7293 ❼Companion 23.
1427 ❼Print Shop ..... 35.
6281 ❼TypeStyler 2.0 *(with ATM)*..... 126.
★**Claris ... 30 day MBG**
2518 ❼MacDraw Pro 275. 7505 ❼Upgrade 95.
8007 ❼Claris CAD 2.0 ..... 599.
Custom Applications
8037 ❼Freedom of Press Light 3.03 *(17 fonts)*. 84.
★**DeltaPoint ... 60 day MBG**
3558 ❼DeltaGraph Professional 2.0 *(w/calc.)* 199.
★**Deneba Software ... 30 day MBG**
3227 ❼Canvas 3.0.4 ..... 259.
★**Expert Software ... 30 day MBG**
4870 ❼Expert Color Paint 1.0 ..... 29.
8619 ❼Expert Home Design 1.0 ..... 29.

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Fractal Design
5425 ❼Painter 1.2 ..... $235.
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Light Source
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Over 100 language fonts..... call
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7651 ❼Action! Mac *(Sept. '92)*..... 349.
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7653 ❼MacroModel ..... 999.
Manhattan Graphics
4990 Ready,Set,Go! 5.0 ..... 219.
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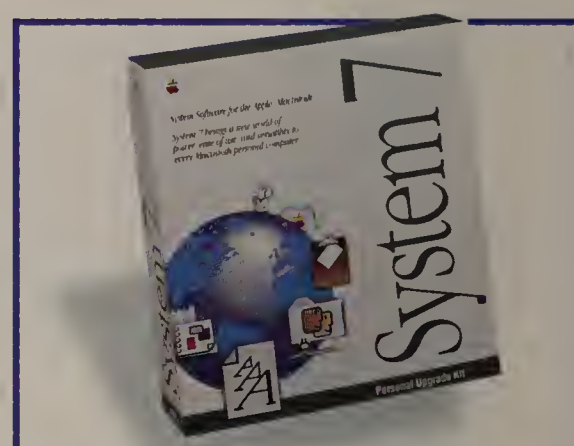
7556 ❼MapArt *(PICT)* or 7555 *(EPS)*..... *ea.* 89.
★**Microsoft ... 30 day MBG**
2878 ❼PowerPoint 2.01E ..... 245.
Postcraft International
2210 ❼Effects Specialist 1.04 ..... 89.
Quark
7612 ❼QuarkXPress 3.1 ..... 549.
★**Specular International ... 30 day MBG**
4962 ❼Infini-D 2.0 ..... 699.
★**TeleTypesetting ... 30 day MBG**
8058 ❼T-Script..... 91. 3014 ❼Deluxe..... 315.

★**Inline Design ... 30 day MBG**
9843 ❼*InSync 1.0*—Finally, a way to synchronize data with your PowerBook and desktop Macintosh. Synchronizes files either automatically or on command via a network or SCSI port ..... **$79.**

Terrace Software
9970 ❼Mum's The Word Plus *(gardening)*... 107.
★**Timeworks ... 30 day MBG**
7115 ❼Publish It! *Easy* 3.0 ..... 109.
7409 ❼Color•It! 2.0 ..... *special* 129.
★**T/Maker ... 30 day MBG**
❼ClickArt *(bitmapped)* 38. or *(EPS)* 82.
★**Virtus Corporation ... 30 day MBG**
4488 ❼WalkThrough 1.1 ..... 309.

PROGRAMMING
UTILITIES, HYPERCARD, SECURITY

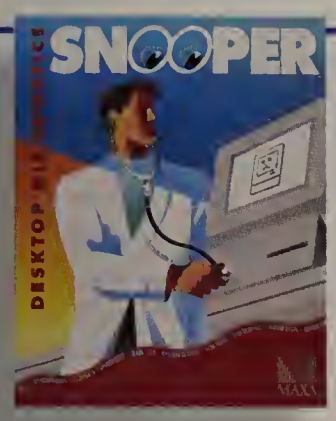
★**Abbott Systems ... 30 day MBG**
2515 ❼Calc+ 1.0 39. 5236 ❼CanOpener 2.0 59.
★**Aladdin Systems ... 30 day MBG**
7410 ❼StuffIt Space Saver 1.0..... 34.
6740 ❼StuffIt Deluxe 3.0 ..... 65.
★**Aldus ... 30 day MBG**
5100 ❼SuperCard 1.6 ..... 195.
★**ALSoft ... 30 day MBG**
9808 ❼MasterJuggler 1.58..... 25.
9807 ❼DiskExpress II 2.11..... 48.
5204 ❼ALSoft Power Utilities 1.0.2..... 62.
★**Alysis Software ... 30 day MBG**
2687 ❼SuperDisk! 49. 1608 ❼More Disk Space 42.



Apple Computer
1074 ❼*System 7 Personal Upgrade Kit*—Add powerful new capabilities like Publish and Subscribe, MultiTasking, Balloon Help, Virtual Memory, and more to your existing system while also making it easier to use **$79.**

Apple Computer
1074 ❼System 7 Personal *(w/free PCTV video)* 79.
3413 ❼System 7 Group Upgrade Kit..... 249.
7072 ❼QuickTime Starter Kit ..... 149.
★**ASD Software ... 30 day MBG**
7085 ❼FileGuard 2.7 *(1 user)*..... 138.
7422 ❼*(5 user)*... 479. 7423 ❼*(10 user)*... 799.
★**Baseline Publishing ... 30 day MBG**
7783 ❼INIT Manager 1.1..... 33.
3114 ❼DiagnoSYS ..... 39.
★**Berkeley Systems ... 30 day MBG**
2198 ❼More After Dark *(M.A.D.)*..... 23.
5737 ❼After Dark 2.0V ..... 28.
2196 ❼After Dark & M.A.D. Bundle..... 39.
★**Casa Blanca Works ... 30 day MBG**
1593 ❼Drive 7 2.2 ..... 49.
★**CE Software ... 60 day MBG**
1727 ❼CalendarMaker 3.0.1 ..... 31.
8024 ❼QuicKeys^2 2.1.2 ..... 89.
★**Central Point ... 30 day MBG**
5041 ❼Mac Tools Deluxe ..... *limited special* 89.
★**Claris ... 30 day MBG**
8734 ❼HyperCard Development Kit 2.1..... 139.
★**Connectix ... 30 day MBG**
8441 CPU 1.0 *(Connectix PowerBook Utilities)* 49.
Coral Research
7310 ❼TimeLog.... 62. 7309 *(10 Pack)*.... 399.
★**Dantz Development ... 30 day MBG**
3393 ❼DiskFit Pro 1.0 ..... 72.
5255 ❼Retrospect 147. 7945 ❼Remote 1.3 264.
7946 ❼Remote *(10 Pak)* 147. 3112 ❼*(50 Pak)* 649.
★**Fifth Generation ... 30 day MBG**
4287 ❼PYRO! 4.01 27. 3955 ❼Suitcase 2.1 53.
7704 ❼Public Utilities *(Sept. '92)*..... 98.
8286 ❼SuperLaserSpool 3.0 ..... 99.
5178 ❼FastBack Plus or 5725 ❼DiskLock... 125.
7404 ❼DiskDoubler 3.7.5 ..... 49.
4838 ❼AutoDoubler 1.0.6..... 49.
★**FWB, Inc. ... 30 day MBG**
7929 ❼Hard Disk Utilities Personal Edition.... 49.
2999 ❼Hard Disk Toolkit 1.1.1 ..... 125.
ICOM Simulations
6296 ❼Intermission.. 29. 3731 ❼OnCue II.. 55.
★**Inline Design ... 30 day MBG**
1744 ❼Icon 7..... 31. 9843 ❼InSync 1.0.... 79.
7068 ❼INITPicker 3.0 *(Sept. '92)*..... 38.
2913 ❼Redux 1.63.... 49. 1740 Deluxe..... 92.
★**Kent Marsh Ltd. ... 30 day MBG**
9513 ❼FolderBolt 1.02 ..... 71.
★**Kiwi Software ... 60 day MBG**
6267 ❼KiwiENVELOPES! 3.1.6 ..... 32.
8783 ❼KiwiPOWER MENUS ..... 25.
★**Magic Software ... 30 day MBG**
7267 ❼AutoSave II 26. 7270 ❼Backmatic.. 50.

already blew it?



★MAXA Corporation ... 30 day MBG
8692 ❼*Snooper 2.0 Hardware & Software Kit*—Sad Mac? Diagnose from your Desktop with Snooper. Check out your hardware with over 60 tests. Rate your Mac performance. A must for your Utilities folder ..... **$149.**

★MAXA Corporation ... 30 day MBG
8692 ❼Snooper 2.0 Hardware & Software Kit 149.
8694 ❼Snooper *(software only)* ..... 119.
★Microcom ... 30 day MBG
4803 ❼Virex/Mac.. 57. 8561 ❼911 Utilities.. 89.
★MicroMat Computer Sys. ... 30 day MBG
3732 ❼MacEKG II 2.0 ..... 89.
★Microspot ... 30 day MBG
8706 ❼MacPalette II..... 45.
8782 ❼MacPlot Professional..... 249.
★Nine to Five Software ... 30 day MBG
9767 ❼Reports 2.5 ..... 125.
★Now Software ... 30 day MBG
1793 ❼Now Up-To-Date... 65. 2366 *(10)*. 395.
6925 ❼Now Utilities 4.0.... 95. 8471 *(10)*. 775.
★ON Technology ... 1 year MBG
6385 ❼On Location 2.0 ..... 75.
Palomar Software
8210 ❼PLOTTERgeist 2.1 ..... 249.
Peripheral Land, Inc. (PLI)
7326 Mac-to-DOS 3.0 ..... 99.

★Prometheus ... 30 day MBG
8990 ❼*Ultima Home Office*— V.32bis Ultima with voice feature added at an even lower price, turns your Mac into an answering machine. 14,400 bps data modem with V.42bis/MNP 5 & 9600 bps S/R fax & full voice capability! **$489.**

Pluma, Inc.
8704 ❼Cause or 8713 ❼Net Effect ..... *ea.* $185.
★Symantec ... 30 day MBG
5176 ❼Symantec AntiVirus for Mac *(SAM)*.... 64.
6748 ❼Norton Utilities for Mac 2.0 ..... 95.
3421 ❼THINK Pascal 165. 2688 ❼THINK C 199.
9957 ❼THINK Reference 1.0 ..... 68.
Teknosys
5203 ❼HELP! ..... 88.
★TGS Systems ... 60 day MBG
6667 ❼Prograph 2.5..... 299.
★Thought I Could ... 30 day MBG
4843 ❼Wallpaper 1.0.2 ..... 37.
UserLand Software
4753 ❼Frontier 1.0 ..... 189.
★Visionary Software ... 30 day MBG
3887 ❼First Things First 2.1.1..... 41.

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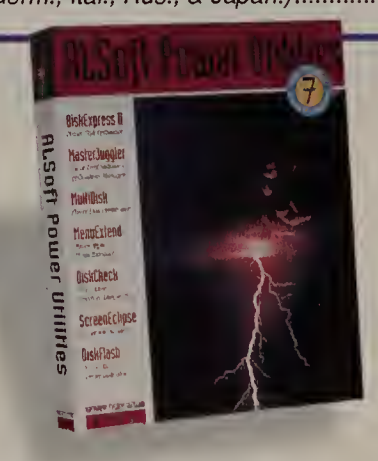
★Abracadata, Ltd. ... 30 day MBG
5805 ❼Sprout! 1.0 *(veggie garden planner)*... 39.
Activision
1039 Shanghai II ..... 29.
1134 Lost Treasures of Infocom..... 40.
★Baseline Publishing ... 30 day MBG
7785 ❼Talking Moose 4.0.2 ..... 22.
Broderbund Software
6516 The Playroom 2.0 *(CP) (color)* ..... 29.
❼Carmen Sandiego Series *(CP)*..... *ea.* 29.
8285 ❼Where/World Carmen Sandiego Deluxe 47.
3559 ❼SimAnt or 5871❼SimCity Supreme. *ea.* 35.
8266 ❼SimEarth 1.1 ..... 40.
Buena Vista Software
1711 ❼Heaven and Earth..... 29.
★Centron Software ... 30 day MBG
2707 ❼Puzzle Master..... 26.
5910 ❼Crossword Creator ..... 39.
8525 ❼Casino Master... 39. 8524 *(Color)*.... 45.
★Cyan ... 30 day MBG
6320 ❼Manhole 1.6..... 19.
★Davidson & Associates ... 30 day MBG
3922 ❼Talking Spell It Plus ..... 29.
2574 ❼New MathBlaster Plus ..... 34.
8278 ❼Alge-Blaster Plus ..... 34.
EARTHQUEST
8050 ❼EARTHQUEST or 3118 ❼Ecology 1.0 34.
Electronic Arts
5702 ❼4D Boxing.... 32. 1907 ❼PGA Golf.. 39.
★Expert Software ... 30 day MBG
6219 ❼Expert Astronomer 1.0..... 29.
Graphic Simulations
4756 ❼Hellcats Over the Pacific 1.0.3 ..... 39.
★Great Wave ... 30 day MBG
8044 ❼Decimal & Fraction Maze *(Color)* ..... 35.
6693 ❼KidsMath 2.0 or 2276 Kid's Time.. *ea.* 25.
4334 ❼NumberMaze.. 25. 8527 ❼*(Color)*.. 35.
1513 ❼ReadingMaze *(Color)* ..... 35.
★HyperGlot Software ... 30 day MBG
(French, German, Italian & Spanish)
❼Word Torture *ea.* 34. ❼Tense Tutor *ea.* 38.
❼Pronunciation Tutor
(Span., Fren.) ea. 34. *(Germ., Chin.) ea.* 38.
★Inline Design ... 30 day MBG
1562 ❼3 in Three or 1944 ❼Swamp Gas. *ea.* 31.
1747 ❼Swamp Gas Europe ..... 31.
8809 ❼Tesserae 31. 3414 ❼Mutant Beach 39.
Interplay Productions
1894 ❼BattleChess *(3D animation)*..... 29.
1893 ❼CheckMate *(infinite play levels)*..... 31.

Buena Vista Software
1711 ❼*Heaven and Earth*—Enjoy 4 spell-binding entertainment experiences in one. Animated cards, illusions, pendulums, and a pilgrimage all bring you to a fuller experience than the usual game, puzzle or toy..... **$29.**

★Learning Company ... 30 day MBG
2670 ❼Reader Rabbit 3.0 *(CP) (ages 4-7)*..... 34.
3687 ❼Super Solvers: Midnight Rescue!..... 34.
3281 ❼The Writing Center 1.0 ..... 51.
★Leister Productions ... 30 day MBG
7126 ❼Reunion 3.0 ..... 115.
★MECC ... 30 day MBG
3963 ❼Oregon Trail 1.0..... 28.
❼Number or Word Munchers..... *ea.* 18.
★Microsoft ... 30 day MBG
2868 ❼Flight Simulator 4.0 *(CP)*..... 42.
★Multimedia Library ... 30 day MBG
7312 ❼Educ. Series V. 1-Animated Relativity 105.
★Nordic Software ... 30 day MBG
8257 ❼Preschool Pack - Color 2.0..... 34.
7470 ❼Jungle Quest 30. 7537 ❼Kolor Klips 37.
★Penton Overseas ... 30 day MBG
❼VocabuLearn/ce Levels I & II *(Span., Fren., Germ., Ital., Rus., Japan., & Heb.)*... *ea.* 35.
❼VocabuLearn/ce Level III *(Span., Fren., Germ., Ital., Rus., & Japan.)*..... *ea.* 35.



★ALSoft ... 30 day MBG
5204 ❼*ALSoft Power Utilities 1.0.2*—Seven performance enhancing utilities for a faster, safer & smarter Mac. Features DiskExpress II for intelligent disk optimization & MasterJuggler for easy font suitcase & applications mgmt. **$62.**

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Our techies can talk

★Freesoft ... 30 day MBG
6115 ❼*White Knight 11*—11 award winning communications program that supports XMODEM, YMODEM, ZMODEM, Kermit, & CompuServe Error Correcting protocols. Includes Okyto 1.0. Geared to all levels of experience ..... **$85.**

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Training for System 7, Excel, Lotus 1-2-3, Persuasion, FileMaker Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, QuarkXPress, ClarisWorks & Mac ..ea. 59.

Pluma, Inc.
8695 Capitalist Pig ..... 34.

★Que Software ... 30 day MBG
9743 ❼Typing Tutor V ..... 29.

Sierra On-Line
2412 ❼Rise of the Dragon ..... 34.
3552 ❼Leisure Suit Larry V or 7396 Red Baron 39.

★SoftStream ... 30 day MBG
4489 ❼Galactic Frontiers ..... 38.
3472 ❼Family Cards *(Solitaire, Rummy, War)* 49.

Software Toolworks
4619 ❼Mavis Beacon Typing 1.3 *(CP)* ..... 32.

★Spectrum Holobyte ... 30 day MBG
4835 ❼Tetris 1.3.. 28. 3017 ❼Wordtris 1.0 . 27.
3459 ❼Falcon 2.2.2 or 8181 ❼Vette 1.0 ... *ea.* 33.

★Strategic Studies ... 30 day MBG
3287 ❼Warlords *(empires at war)* ..... 34.

StudyWare
❼ACT, GMAT, GRE or SAT Prep ... *ea.* 29.
8098 ❼LSAT Prep ..... 35.

★Toyogo ... 30 day MBG
7624 ❼NEMESIS Go Master 5.0 ..... 38.
7623 ❼NEMESIS Go Master Deluxe 5.0 ..... 99.

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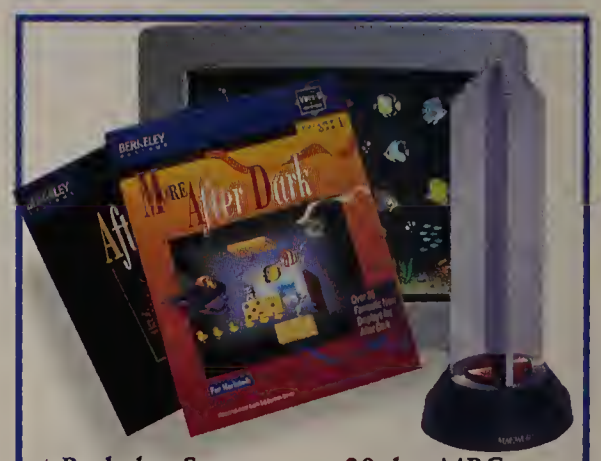

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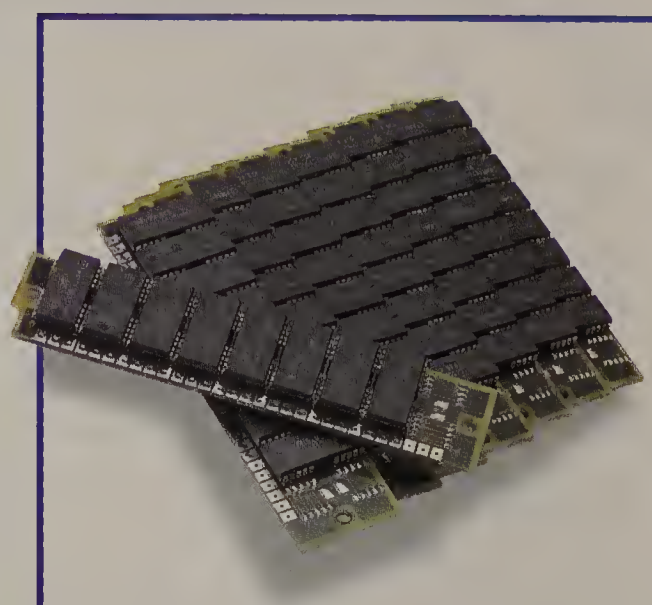

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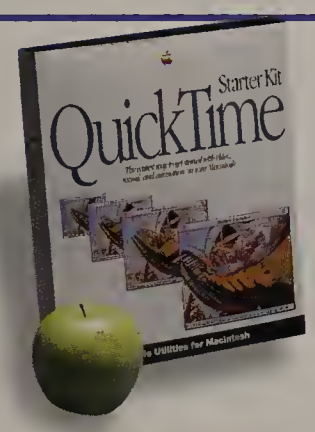

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Budget Computing

BY DEBORAH BRANSCUM

SOME FOLKS BUY HEAPS OF high-end software and the latest Macintosh model as soon as it comes on the market. That's reasonable if they need serious, professional tools (or if they have buckets of money). But high-priced products can be overkill for those of us with simple needs. Color graphics don't necessarily demand Adobe Photoshop, for example, at a street price of $550. And a used SE is far more affordable than a Quadra, and adequate for a small business. Below are five strategies to combat the high cost of computing.

Shareware

SHAREWARE IS NOT FREE, BUT IT IS inexpensive, accessible, and often surprisingly good. Mac owners with modems can download shareware (and freeware) from online services, while others can find it through Macintosh user-group libraries and from commercial companies that distribute it for a fee. Finding shareware isn't really the hard part—the hard part is sorting through thousands of programs to find the shareware that meets your needs.

Two user groups and a new book aim to make that task easier. BCS Mac (617/864-1700), the Macintosh special-interest group of the Boston Computer Society, maintains a terrific shareware catalog that rates some 1800 programs on ease of use and overall quality. All the programs listed are part of the BCS Mac Software Exchange Library. Nonmembers of the group can purchase the catalog for $17.95, and software for $10 per disk.

Many user groups offer members a shareware disk-of-the-month for a nominal fee. The Los Angeles Macintosh Group (310/278-5264) has expanded on the concept with a two-disk set of 15 programs and utilities the group calls the best shareware around. The disks include ZTerm (described later), Disinfectant (the legendary, free virus-detection application), and 13 other crowd pleasers, according to executive director Suzy Prieto. There is a hitch, though—you have to become a member to get the software disk set, which costs $5. So sign up.

Another way to track down shareware is through *The Mac Shareware 500*, a new book from Ventana Press (919/942-0220). Authors Ruffin Prevost and Rob Terrell evaluated some 15,000 shareware and freeware programs and rated the ones they found most useful and fun. The $39.95 volume includes three disks containing 17 shareware programs and fonts. The book purchase also includes five hours of free connect time on America Online, where all 500 programs listed can be found in the Macintosh Shareware 500 Library. (CompuServe and other services are likely to have many of the programs as well.)

You might not associate shareware with business, but Prevost and Terrell found a gem in Mariner, a spreadsheet by William Paar. Mariner isn't flawless—it supports only text and Mariner file formats, for example, and Prevost and Terrell found some bugs—but it has several powerful features. The program lets users change the width and height of cells and change text fonts and sizes. It supports multiple levels of undo, background recalculation, and more than 60 built-in functions. The version on America Online is 1.1c; the most recent version is on CompuServe. Paar tells me that version 2.0, which supports three-dimensional layers, file linking, and named ranges, among other improvements, should be out by October. The programmer said he wrote Mariner in part because he couldn't afford Microsoft Excel. At $40, which includes a 50-page manual, this spreadsheet is quite a bargain. (Paar can be reached at 1903 Fox Trail Dr., La Grange, KY 40031.)

A less dazzling, but still useful, business program is BiPlane 2.0, a $59 spreadsheet that was awarded four stars in *The Mac Shareware 500*. Other highly rated programs include Image and ZTerm. Image is a freeware processing and analysis program by Wayne Rasband that rivals some commercial programs, according to Prevost and Terrell; while ZTerm, $30 software from David Alverson, is "the best shareware terminal-emulation program you can get."

Several popular commercial programs started out as shareware, including StuffIt and Kid Pix. More shareware authors may be forced to go commercial if users ignore the fees. Please remember to mail in payment for the shareware programs you use—paying for the disks is not enough.

Five strategies that save you money

Low-Cost Commercial Software

WRITENOW 3.0 FROM T/MAKER AND MacWrite II from Claris are two sound yet fairly inexpensive word processors at mail-order prices of aproximately $150 and $90, respectively. The new version of WriteNow is especially sleek and inviting and was awarded four stars in a September *Macworld* review. Both programs have long, respected histories on the Mac and offer many useful features. (Look for Claris to launch a low-end line of software—with retail prices of $50 to $200—in the near future.)

Less expensive and, in turn, less flexible programs include ExpertWriter from Expert Systems (305/444-0080) and QuickLetter from Working Software (408/423-5696), which both sell at a suggested retail price of $49.95; street prices should be lower. The two programs are identical except for packaging and templates. Both are intended for short letters and memos and include spelling checkers, address books, and envelope printing capabilities. ExpertWriter offers more letter templates than its rival.

Several 32-bit color graphics programs are available at reasonable (and approximate) mail-order prices, including Color It ($169) from MicroFrontier (515/270-8109, 800/388-8109); Color MacCheese ($56) from Delta Tao (408/730-9336, 800/827-9316); and Expert Color Paint ($29) from Expert Systems. The first two programs got good press in "Paint Imitates Life," *Macworld*'s paint-program overview in the March 1992 issue. Expert Color Paint won a four-star review in our June 1992 issue, and is a good, affordable bet for novices.

MySoftware Company (415/325-9375) publishes several low-cost packages, including MyAdvancedDatabase and MyAdvancedMailList. Those products sell for less than $50

continues

Service Hero

Nick Ailamakis of Greece writes to thank Symantec for superior technical support. "I had a serious problem with a crashed SUM partition, but Steve [Wolf] stood by my side with overseas telephone support and a four-page fax transmission." Ailamakis recovered the partition with Symantec's help.

via mail order. Scaled-down versions of the programs, called MyDatabase and MyMailList, will be out soon and should sell for less than $25. The only program I've seen in the series is MyAdvancedDatabase, which is friendly, functional, and easy to use. It's a good beginner's flat-file database.

Integrated Software

INTEGRATED PACKAGES ARE MORE EXpensive than the programs discussed so far but still offer a good value for the money. Best-seller ClarisWorks, for example, combines word processing, page layout, graphics, spreadsheet, charting, telecommunications, and database features in a single package that sells for about $199 via mail order. Similar packages are available from Symantec (GreatWorks for $139), Beagle Bros (BeagleWorks for $185), and others. "All-in-One Programs," *Macworld*, June 1992, covers the strengths of six integrated packages. Seriously tardy Microsoft Works 3.0 should be shipping by the time you read this and selling via mail order at about $159. The program's improvements include a stand-alone draw module, page-layout features, and the ability to include graphics in database files. Will Microsoft beat Claris in the integrated-software department? That remains to be seen. But whatever integrated package you choose should be a bargain compared with buying five or six individual applications.

Used Hardware

THERE ARE MANY WAYS TO SCORE A used Mac and peripheral equipment, including computer brokers, local classified ads, and direct-mail companies.

There are at least three national used-computer brokerages. The oldest is the Boston Computer Exchange (617/542-4414), which pioneered the concept in the United States. The American Computer Exchange (404/250-0054, 800/786-0717) in Atlanta and the National Computer Exchange (212/614-0700, 800/659-2468) in New York were founded using the principles established in Boston.

The Boston Computer Exchange has changed from its early days when it was solely a liaison between computer sellers and buyers. These days it also buys equipment directly from sellers and maintains an inventory of used equipment as well as contacts with potential sellers. "It's transparent to the user whether it was in stock or whether we got it from a listing," says Alex Randall, who founded the BCE. "A lot more gear comes to us from dealer overstock." Buyers get a seven-day warranty from BCE, which sells one-year service contracts for $99. Call 617/542-2345 ext. 300 to receive a fax listing BCE's used-computer price index and inventory.

The American Computer Exchange (AmCoEx) and National Computer Exchange (NaComEx) are more-traditional brokerages, making money from sales commissions by linking sellers and buyers. AmCoEx (which provides the index of used-Mac prices on the *Best-Sellers* page of *Macworld*) charges a $25 listing fee to sellers, then runs diagnostic tests on equip-

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ment after a sale has been negotiated. "When a buyer calls, we go through our database and try to find something that meets their needs," says AmCoEx president John Hastings. A buyer then sends a check for the price to AmCoEx, and if the seller's equipment works, AmCoEx ships the equipment, in turn, to the buyer. The seller receives payment minus a 10 percent sales commission. AmCoEx holds the money for 48 hours and charges a $25 escrow fee to buyers who want an additional 48 hours to personally check out their purchases before sellers receive payment.

The National Computer Exchange works a little differently, according to founder Robert Zises. There is no charge to buyers using the service; sellers pay a 15 percent sales commission. Sellers listed with NaComEx insure their equipment and then ship it directly to buyers. Payment is kept in an escrow account for 48 hours before being released to sellers; buyers must check the equipment themselves. The company also offers one-year service contracts that generally cost about 15 percent of the value of the computer or peripherals.

Many companies sell used Macs. To find them, check the back pages of *Macworld* and other industry publications such as *Computer Shopper*, which should be available on newsstands. And to best protect yourself, use a credit card when making a direct-mail purchase.

The value of used computers and equipment varies by region and is affected, usually dramatically, by Apple product announcements and price cuts. That hurts users selling their machines, but buyers generally benefit. According to Alex Randall, the most popular used Mac sold by the BCE is the Mac SE/30. "It's the best computer Apple ever made," says Randall, "the sweetest machine in the set. That doesn't mean the price is set artificially high. Just because people want the SE/30 doesn't mean the price goes up, because the ceiling is set by dealers selling new machines."

If you want to buy a used Mac (or any Mac, for that matter) and don't know which one to choose, check out BMUG's guide, *Which Macintosh Should I Buy?* This useful booklet is available free by requesting it in writing from BMUG at 1441A Walnut St., #62, Berkeley, CA 94709.

Penny-Pinchers, Unite!

MANY SOFTWARE COMPANIES OFFER competitive upgrades (for example, to buy Lotus 1-2-3 for $89 requires a photocopy of a manual page or disk of Microsoft Excel), bundles, or special deals to lure buyers. Mail-order prices on a particular product can vary widely, and several companies sell their programs direct, which gives them flexibility in pricing. Working Software, for example, is selling its Findswell search utility for $9.95 until the end of the year. Another example is Microsoft, which has created Club Works for Microsoft Works buyers. Membership, which is automatic, lets registered Works owners buy other Microsoft products at the upgrade price, among other benefits. So before you buy, take advantage of 800 telephone sales lines to compare prices and ask if there are any additional benefits to owning a specific product.

And if you are a smart shopper, send me your money-saving tips so I can share them in a future issue. In the meantime, happy bargain hunting. **m**

Research assistance by CAROLYN BICKFORD.

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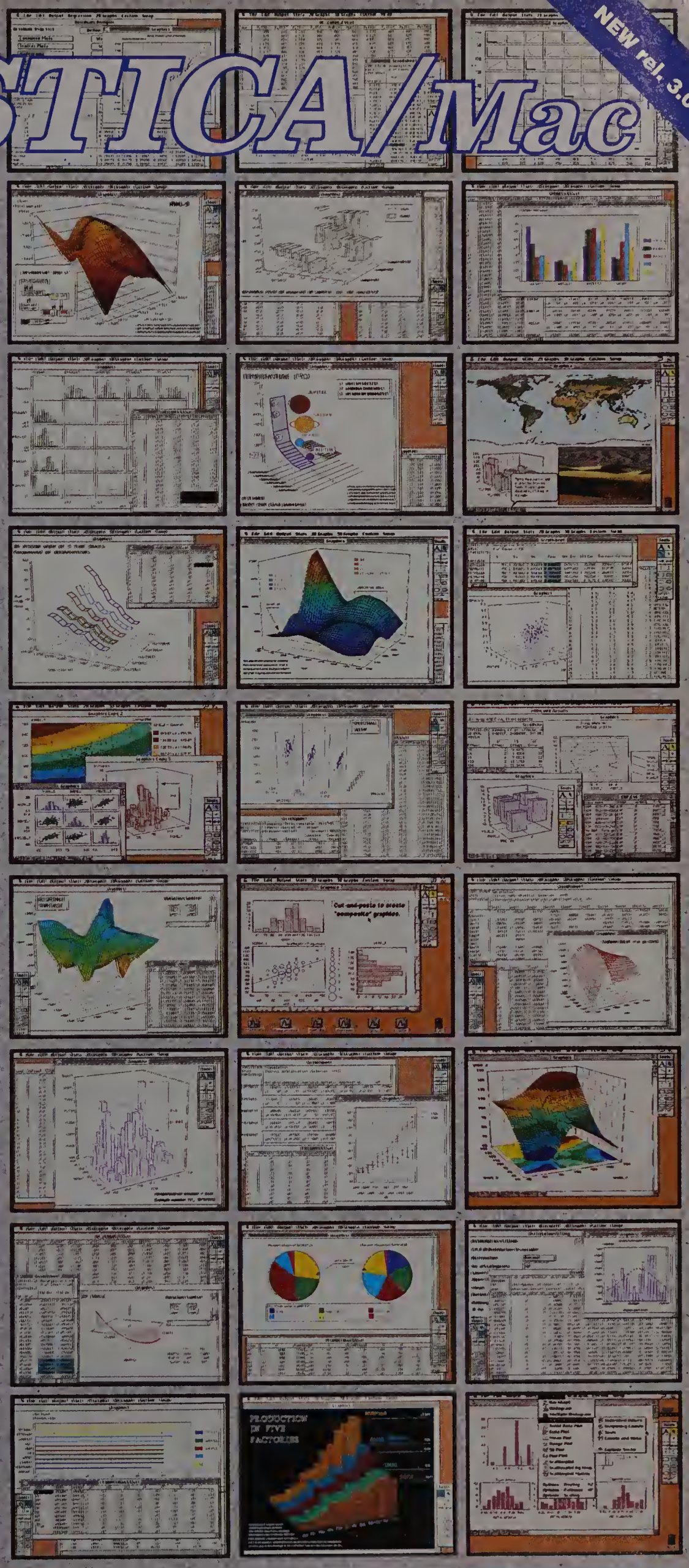

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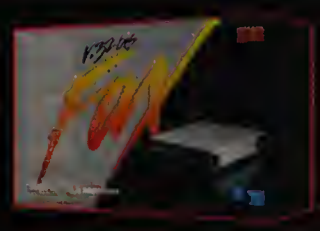

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ALDUS DIGITAL DARKROOM	2.0	1MB/6.0		*
ALDUS FREEHAND	3.1	1MB/6.0.5	6/92	*
ALDUS PAGEMAKER	4.2	4MB/6.0.5	5/92	*
ALDUS PERSUASION	2.1	4MB/6.0.5		*
ALDUS SUPERCARD	1.6	2MB/6.0.4		$50
ALDUS SUPERPAINT	3.0	1MB/6.0.5	3/92	$65
ALIAS SKETCH	1.5	BMB/6.0.5	B/92	$25
ALISAMAIL	4.0	1MB/6.0		*
ALLIANCE POWER TOOLS	2.42	1MB/6.0.4		*
AMAZING PAINT	1.0.3	512KE/6.0.4		$15
AME	2.03	1MB/6.0.2		$49.95
ANTITOXIN	2.0	1MB/6.0		$15
APPLESHARE FILE SERVER	3.0	512K/3.2		*
ARCHICAD	4.1	5MB/6.0	6/92	10% OF LIST
ASHLAR VELLUM	2.10	4MB/6.0.2		*
ASHLAR VELLUM 3D	2.10	4MB/6.0.2		*
ATONCE	1.2	1MB/6.0.5		*
AUTHORWARE PRO	1.7	2MB/6.0.5		*
AUTOCAD	12	5MB/6.0.5		$500
AUTODOUBLER	2.0	1MB/6.0.4	9/92	*
AUTOSAVE II	2.0	512KE/4.2		*
A/UX	3.0	4MB/6.0.5	11/92	*
AZIMUTH	2.1	1MB/6.0.2		$45

PRODUCT	V.	REQ.	★	$
BACKMATIC	2.0	1MB/4.2	2/92	*
BEAGLEWORKS	1.0.1	1MB/6.0.5		FREE
BILL-IT	4.0	1MB/6.0.3		$29
BUSINESS SENSE	1.6	1MB/6.0.7		$69
CA-CRICKET PRESENTS	2.0.1	1MB/6.0		*
CALENDAR	1.1.2	512KE/6.0		FREE
CANOPENER	2.0	512K/3.0		$29
CANVAS	3.0	1MB/6.0.2	1/92	*
CAPTURE	4.0	1MB/6.0		$30
CARBON COPY MAC	2.0	1MB/6.0.5	4/92	*
CAT III	1.2	1MB/6.0		*
CAUSE	2.12	1MB/6.0		*
CC:MAIL FOR MACINTOSH	2.0	1MB/6.0.4		$25
CHECKLIST	2.0	1MB/6.0	2/92	*
CHECKMARK PAYROLL	4.6	512K/4.2		$50
CINEMATION	1.0	4MB/6.07	7/92	NA
CLARIS CAD	2.0v3	2MB/6.0		$79
CLARIS RESOLVE	1.1	1MB/6.0.5	1/92	$20
CLARISWORKS	1.0	1MB/6.0.5	3/92	NA
CLICKCHANGE	1.05.2	1MB/6.0.4		$5
CLICKPASTE	2.1	1MB/6.0		$20
CMS UTILITIES	7.0	2MB/7.0		$25
COMPACT PRO	1.33	1MB/4.2		FREE
COLORSTUDIO	1.5	4MB/6.0.5	3/92	*
COMPUSERVE INFORMATION MANAGER	1.5.1	1MB/4.1		*
COMPUSERVE NAVIGATOR	3.1	512K/4.1		*
CONCERTWARE+	4.0	512KE/4.2		$15
CONNECTIONS	2.1	2MB/6.0.5	11/92	FREE
CONTROL CLASSIC	1.1.3	4MB/6.0.5		FREE
CORRECT GRAMMAR	3.0	1MB/4.2	B/92	$29.95
DATACLUB CLASSIC	2.0	2MB/6.0	B/92	*
DATA SHAPER	1.2	1MB/6.0		$40
DECK	1.03	2MB/6.0.7		FREE
DELTAGRAPH PROFESSIONAL	2.0	2MB/6.0.5	5/92	$69.95
DESCARTES	1.04	2MB/6.0.3		FREE
D.E.S. DOCUMENT EXCHANGE SYSTEM	4.1	1MB/6.0		*
DESIGNCAD	3.0	2MB/6.0.5		*
DESIGNCAD 2D/3D	3.0	2MB/6.0.5	11/92	$50
DESIGNSTUDIO	2.0	1MB/6.0		*
DESK	3.08	1MB/6.0.5		$24.95
DESKPAINT	3.07	1MB/6.0.5		$19.95
DIGITAL DARKROOM	2.0	1MB/6.0.4		$80
DISKDOUBLER	3.7	1MB/6.0.2		$15

continues

V. = version #. **Req.** = min. RAM and system software required. ★ = last time (in the past year) this or an earlier version was reviewed. **$** = cost of update to registered owners. **NA** = first version, not applicable. * = contact your dealer for update policy. **Blue** = new version. **Yellow** = reviewed product.

NEW!

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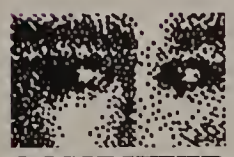
For Any Macintosh

New ComputerEyes/RT offers affordable, accurate real-time 24-bit color video frame capture for any Macintosh computer (SE, Classic, LC, IIsi, Mac II, Quadra, etc.). Portable external SCSI device is easily moved from Mac to Mac. Real-time video preview directly on the monitor. Fast, full-screen 640x480 image grab in 1/30th second. Supports all Macintosh 8-bit and 24-bit displays. Outputs standard TIFF and PICT files. Also supports QuickTime for capturing video animations! See your dealer or call (800) 346-0090 for more information and free demo.

List price - $599.95



COMPUTER EYES

Digital Vision, Inc.
270 Bridge Street
Dedham, MA 02026
(617) 329-5400

Circle 242 on reader service card

PRODUCT	V.	REQ.	★	$
DISKEXPRESS II	2.10	1MB/6.0		FREE
DISKFIT PRO	1.1	1MB/6.0	4/92	*
DISKTOP	4.0.2	1MB/6.0		*
DISPLAY ADBUILDER	1.1	1MB/6.0.3		*
DOCUCOMP II		1MB/6.0	11/92	$29.95
DOLLARS & SENSE	5.0	512KE/3.2		*
DOUBLE HELIX	3.5	1MB/6.0		$99
DREAMS	1.1	1MB/6.0.2		*
DYNAPERSPECTIVE	2.3	2MB/6.0.5		$149
DYNODEX	2.0	1MB/6.0	2/92	$25
EASY COLOR PAINT	2.02	1MB/6.0.2		*
EHELP	2.0	1MB/4.1		$445
EMPOWER II	4.0.7	2MB/4.2		*
ENCORE	2.5	2MB/6.0.2		*
ENHANCE	2.0	2MB/6.0.3		$100
EVOLVE	1.1	2MB/5.3		$25
EXODUS	4.0	2MB/6.0.3		$75
EXPRESSIONIST	3.0	1MB/6.0.2		$49.95
EZ VISION	1.0	1MB/6.0.3		NA
FAIR WITNESS	1.2	1MB/6.0.2	10/92	FREE
FASTBACK PLUS	2.6	1MB/6.0	4/92	*
FAST FORMS	2.0	1MB/6.0		$25
FASTLABEL	3.1	1MB/6.0		$10
FASTTRACK	1.5	512KE/5.5		$20
FILEGUARD	2.7	1MB/4.2		$1B
FILEMAKER PRO	2.0	1MB/6.0		$B9
FILEVISION V	1.1	1MB/6.0.2		*
FINALE	2.6	1MB/6.0.2		FREE
FIRST THINGS FIRST	2.1.2	1MB/6.0.4	4/92	*
FLEXICAD	2.20	5MB/6.0.4		*
FONTMONGER	1.0.5	2MB/6.0.2		FREE

PRODUCT	V.	REQ.	★	$
FONTOGRAPHER	3.5	1MB/4.2	11/92	*
FONTSTUDIO	2.0	1MB/6.0.5		*
FORM Z	2.0	2MB/6.0		*
FOXBASE+/MAC	2.01	1MB/6.0		FREE
FRAMEMAKER	3.0	1MB/6.0	3/92	*
FREEDOM OF PRESS LIGHT	3.0.3	2MB/6.0.3		$25
FREEDOM OF PRESS PROFESSIONAL	3.0.2A	4MB/6.0.3		$250
FULL IMPACT	2.0	1MB/6.0		$50
FULLWRITE PROFESSIONAL	1.5	2MB/6.0.2		*
GENERIC CADD	2.0	2MB/6.0.5		$100
GEOQUERY	3.02	1MB/6.0		*
GOFER	2.0	1MB/4.1	6/92	$25
GQL	3.0	2MB/5.0		$75
GRACELAN	2.0	1MB/6.0.5		*
GRACELAN UPDATE MANAGER	1.0	2MB/6.0.5		NA
GRADE MACHINE	5.0	1MB/6.0.5		50% OF LIST
GRAMMATIK MAC	2.05	1MB/6.0		$15
GREAT GANTT	1.4	1MB/6.0		*
GREAT PLAINS ACCOUNTING SERIES	6.0	1MB/4.2		*
GREATWORKS	1.0	1MB/6.0.2	1/92	NA
GUIDE	2.0	512K/4.1		$50
HAND-OFF II	2.2.5	2MB/6.0.2		FREE
HELP	1.0.3	1MB/6.0	2/92	FREE
HYPERCARD	2.1	1MB/6.0.3		$49
HYPERDA	2.1	1MB/6.0		$29
ICON-IT	2.1	1MB/6.0.2		*
IF:X FORMS DESIGNER	1.1	1MB/6.0		FREE
IGOR	1.2	2MB/4.2		$35
IMAGE GRABBER	3.0	1MB/6.0	2/92	$1B

PRODUCT	V.	REQ.	★	$
IMAGESTUDIO	1.7	1MB/6.0		$99
INFINI-D	2.0	4MB/6.0.4		*
INITPICKER	2.02	1MB/6.0		$10
INSIDE OUT	II	1MB/6.0.2		*
INSPIRATION	3.0.1	1MB/4.2	12/91	*
INSTANT-EXPERT PLUS	2.0	1MB/5.0		FREE
INTOUCH	1 1.7	512KE/4.2	3/92	FREE
KIWIENVELOPES	3.1	512KE/4.1		*
LABVIEW	2.2	4MB/6.0.5		*
LANGUAGE SYSTEMS FORTRAN	3.0	2MB/6.0.4		$100
LAPLINK MAC III	3.2	512K/2.0		FREE
LAPLINK MAC PLUS III	3.0	512K/2.0		*
LASERPAINT COLOR II	1.02	1MB/6.0.3		FREE
LETRASTUDIO	2.0	2MB/6.0	10/92	*
MACANALYST	3.1	2MB/6.0		*
MACARCHITRION	5.5	2MB/6.0.3		*
MACBRAIN	3.0	1MB/6.0.5		$295
MACDRAFT	2.1	1MB/6.0.2		*
MACDRAW II	1.1	1MB/6.0		*
MACDRAW PRO	1.5	2MB/6.0.5		*
MACENVELOPE	5.1	1MB/4.2		$29.95
MACENVELOPE PLUS	2.0	512KE/3.2		$50
MACFLOW	3.7	1MB/6.0		$30
MACFORTRAN II	3.1	4MB/6.0.3		$99
MACGLOBE	1.0	1MB/6.0.4	4/92	*
MACLABELPRO	1.5	1MB/6.0.3		$19.95
MACLINKPLUS/PC	6.0	1MB/6.0.3	3/92	*
MACMONEY	3.5	512KE/4.0		$12
MACPAINT	2.0	512KE/3.2		$25
MACPALETTE II	2.2	1MB/6.0.5	9/92	*
MACPHONEBOOK	3.0	1MB/6.0		*

PS17, PS35 and Turbo models now priced lower!

Five reasons to pick a

No matter which Macintosh® computer you have, there are strong reasons why there's a perfect microLaser printer to go with it. Personal or shared.

1. It's affordable.

For the value-conscious, take a 9 pages-per-minute laser printer, load it up with 17 scalable outline fonts from the Adobe® PostScript® software library, give it an operating cost of 1.9* cents per page and price it at $1,449**. Now you've got the best value in the business, for yourself or your business. It's the microLaser PS17.

POSTSCRIPT Software From Adobe

2. It's upgradeable.

Now take the microLaser we just talked about, double the fonts, have the options of Turbo upgrades for fast graphics, price it at $1,549** and you've got the microLaser PS35.

MacUser ★★★★

3. It's powerful.

For high-speed PostScript printing with a built-in RISC processor, PostScript Level 2, 35 fonts, and automatic switching between PostScript and HP LaserJet® emulation, try a high-performance microLaser Turbo. Perfect for the power user at $1,799**.

4. It's shareable.

And if you're into networking, the 16 ppm microLaser XL Turbo flies through documents

PRODUCT	V.	REQ.	★	$
MACPLOT PROFESSIONAL	4.0	1MB/6.0.5		*
MACPLOT STANDARD	4.0	1MB/6.0.5		*
MACPROJECT II	2.51	1MB/6.0		$99
MACRECORDER	2.03	512K/3.2		*
MACRENDERMAN	1.1	5MB/6.0.5		$75
MACROMIND DIRECTOR	3.1	2MB/6.0.5		$149
MACSCHEDULE	2.5	1MB/6.0		$30
MACSCHEDULE PLUS	1.0.5	1MB/6.0		FREE
MACSPIN	3.01	512K/4.3	3/92	*
MACTERMINAL	3.0	512K/3.2		$65
MACTOOLS	2.0	2MB/6.0	10/92	$55
MACTOPS	3.1	1MB/6.0.5		*
MACVISION	4.1	2MB/6.0.4		*
MACWRITE II	1.1v2	1MB/6.0		FREE
MAGIC	1.1	2MB/6.0.7	8/92	FREE
MANAGING YOUR MONEY	4.0	1MB/6.0.3		*
MANAPRO GENERAL LEDGER	3.1	1MB/6.0		NA
MAPLE V		2MB/6.0.7	5/92	*
MARCOPOLO	1.1	1MB/6.0		FREE
MARKET ANALYZER PLUS	2.0	2MB/6.0.2		$99
MARKETMASTER	3.5	2MB/6.0.3		*
MARKUP	2.0	1MB/6.0		$30
MASTERFINDER	1.1	1MB/6.0.5	11/92	*
MASTERJUGGLER	1.57	512K/6.0		$15
MASTERPLAN	1.03	512K/6.0.5		FREE
MASTER TRACKS PRO	5.0	1MB/4.1		$45
MATHCAD	2.06	1MB/6.0.2		FREE
MATHEMATICA	2.0	1MB/6.0		*
MATHTYPE	2.1.1	512K/6.0.2		*
MATHWRITER	2.0	2MB/6.0.5		*
MATLAB	4.0	1MB/3.0		*

PRODUCT	V.	REQ.	★	$
MEDIATRACKS	1.01	1MB/6.0.2		FREE
MENUFONTS	4.01	1MB/6.0.5	5/92	$20
METADESIGN	3.0	1MB/6.0		$49.95
METAPICT	2.0	512KE/4.5		$69
MICHAEL'S DRAW	1.0	1MB/6.0.5	12/91	NA
MICROPHONE II	4.0	2MB/6.0	7/92	*
MICRO PLANNER MANAGER	1.0	2MB/6.0		*
MICROSOFT EXCEL	4.0	1MB/6.0.2	10/92	*
MICROSOFT FILE	2.0	512K/3.2		*
MICROSOFT MAIL	3.1	1MB/6.0.2		*
THE MICROSOFT OFFICE	2.5	1MB/6.0.2		*
MICROSOFT POWERPOINT	2.01	1MB/6.0		FREE
MICROSOFT PROJECT	3.0	2MB/6.0.4		$149
MICROSOFT WORD	5.0	512KE/3.2	4/92	$129
MICROSOFT WORKS	3.0	1MB/6.0.5		$79
MINDLINK	2.0	1MB/6.0		*
MINDWRITE	2.1	512KE/4.2		*
MINICAD+	4.0	1MB/6.0		*
MINITAB	8.2	1MB/6.0.1	6/92	*
MOCKPACKAGE PLUS UTILITIES	4.4	512KE/3.2		$15
MODELSHOP II	1.1	1MB/6.0.2	3/92	FREE
MORE	3.1	1MB/4.1		*
MR. FILE	1.1.1	1MB/4.2		FREE
MULTI-AD CREATOR	3.5	2MB/6.0.3		$149
MULTILEDGER	2.0	512K/3.2		$75
MUSICPROSE	2.1	1MB/6.0		FREE
MUSIC PUBLISHER	2.5.2	1MB/6.0	12/91	$15
MYADVANCEDMAILLIST	3.0	512K/4.1		*
MYDISKLABELER III	3.0.4	1MB/6.0		*
M.Y.O.B.	3.0	1MB/6.0		$79
MYTIMEMANAGER	4.0	1MB/6.0.3		*

PRODUCT	V.	REQ.	★	$
NETMINDER ETHERNET	2.1	2MB/6.0		$100
NETWORK BUNDLE FOR THE MAC	3.0	512K/3.2		*
NETWORK SUPERVISOR	2.0	2.5MB/6.0.3	8/92	*
NISUS	3.06	1MB/6.0.2	8/92	*
NORTON UTILITIES FOR MACINTOSH	2.0	1MB/6.0.4	10/92	$39
NOVALINK PROFESSIONAL	2.1	2MB/6.0.7	7/92	FREE
NOW UTILITIES	3.0.1	1MB/6.0.4	2/92	$49
NUBASE PRO	1.54	1MB/4.1	9/92	*
OMNIPAGE	3.0	4MB/6.0		$25
OMNIPAGE PROFESSIONAL	1.0	5MB/7.0		*
OMNIS SEVEN		2MB/6.0		*
ONCUE II	2.0	512K/6.0.2		$34.95
ON LOCATION	2.0	1MB/6.0.5	6/92	$25
ON SCHEDULE	2.0	1MB/3.0		*
PACO	2.0	1.5MB/7.0		*
PANORAMA	2.03	1MB/6.0	5/92	*
PERFORMER	3.61	2MB/6.0.2		*
PERSONAL PRESS	2.0	1MB/6.0.3		$39.99
PHONENET LIAISON	3.0	1MB/4.2		$75
PHOTOMAC	1.5	2MB/6.0.3		$75
PICKTURE	1.0	512K/6.0		NA
PICTUREBOOK+	1.0	1MB/6.0	2/92	*
PICTUREPRESS	2.0	2MB/6.0.4		*
PIXELPAINT	2.1	2MB/4.1		*
PIXELPAINT PROFESSIONAL	2.01	4MB/6.0.5		$125
PLAINS & SIMPLE	1.06	1MB/3.2		*
PLANISOFT	1.3	512K/4.2		$48
POSTERWORKS	2.1	2MB/6.0.3		*

continues

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5. It's reliable.

When you buy a printer, you want it to print. And print. And print. That's just what the microLaser does — the first time, every time, for years.

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It's incredible. So pick up the phone and call for details and the name of a dealer near you.

1-800-527-3500.

MACWORLD MW EDITORS CHOICE

Circle 313 on reader service card

TEXAS INSTRUMENTS

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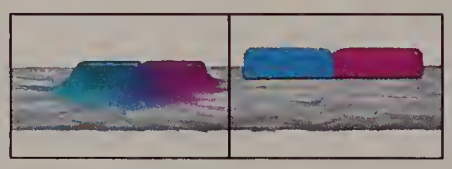
*Based on suggested retail price of consumables and approximate page coverage rating for each consumable at 4% black (toner, developer and OPC).

**Suggested retail price — includes AppleTalk interface. Dealer prices may vary microLaser is a trademark of Texas Instruments Incorporated. Mac, Macintosh and AppleTalk are registered trademarks of Apple Computer, Inc. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. LaserJet is a registered trademark of Hewlett-Packard, Inc. The microLaser printer family has earned *MacWorld's* 1992 Editor's Choice Award and the microLaser Turbo has earned *MacUser's* 1992 Four Mice award. Reprinted from *MacUser*, September 1992. ©1992 Ziff Communications Company.

Claude Monet. *Japanese Bridge at Giverny, 1900.*

The image is priceless.

The clear superiority of solid ink technology is becoming legend.



Liquid ink bleeds, often causing unintended and inaccurate color. Solid ink does not.

Vibrant, precision color is finally here, and with JOLT™ it's also finally affordable.

Perhaps more surprising is that the image above is even better than this ad can show you, because this magazine uses a liquid ink which bleeds when it hits the paper. Solid ink holds its shape for noticeably better resolution.

Not only did Dataproducts pioneer the development of solid ink technology, our JOLT is also $3000 less than the only other color solid ink Adobe® PostScript® Level 2 printer on the market. It's the world's lowest priced color solid ink printer.

Even more impressive is JOLT's flexibility. Because of the non-dispersing nature of solid ink, it can not only print on plain paper, but on virtually any paper surface, giving you immense lati-

© 1992 Dataproducts Corporation. Dataproducts and its associated logomark are registered trademarks, and the Dots in Motion design, JOLT, JOLT PS, and the

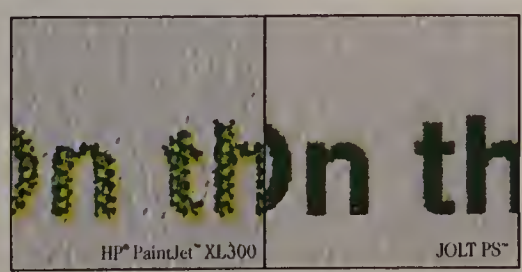
Claude Monet. *Japanese Bridge at Giverny, 1900.* Oil on canvas, 89.8 x 101cm, Mr. and Mrs. Lewis Larned Coburn Memorial

Fortunately, the printer isn't.

tude when creating documents, presentations, publications and color comps.

And because of its solid ink technology, JOLT prints more readable text, even at extremely small point sizes.

Finally, JOLT is also more economical since it doesn't require any kind of special paper.



Unlike liquid ink printers, JOLT creates crisp characters in solid, bold color (enlarged 250%).

Imagine. Now you can produce 16.7 million different hues with the precision and vibrancy of solid ink technology, all at a remarkably low price.

So see your Dataproducts dealer today for a JOLT demonstration or call 1-800-334-3174 for more information.

Then stop by and check out JOLT, because when it comes to color printing, seeing is believing.

Dataproducts.®

The high performance printer people™

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Circle 38 on reader service card

SILVERVIEW™ PRO

A REAL PRO NEEDS TWO FULL PAGES.

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Circle 128 on reader service card

PRODUCT	V.	REQ.	★	$
POWERDRAW	3.0	1MB/6.0		*
POWERSTATION	2.5.5	512K/4.1		*
POWERTRAX	1.1	1MB/6.0.5		FREE
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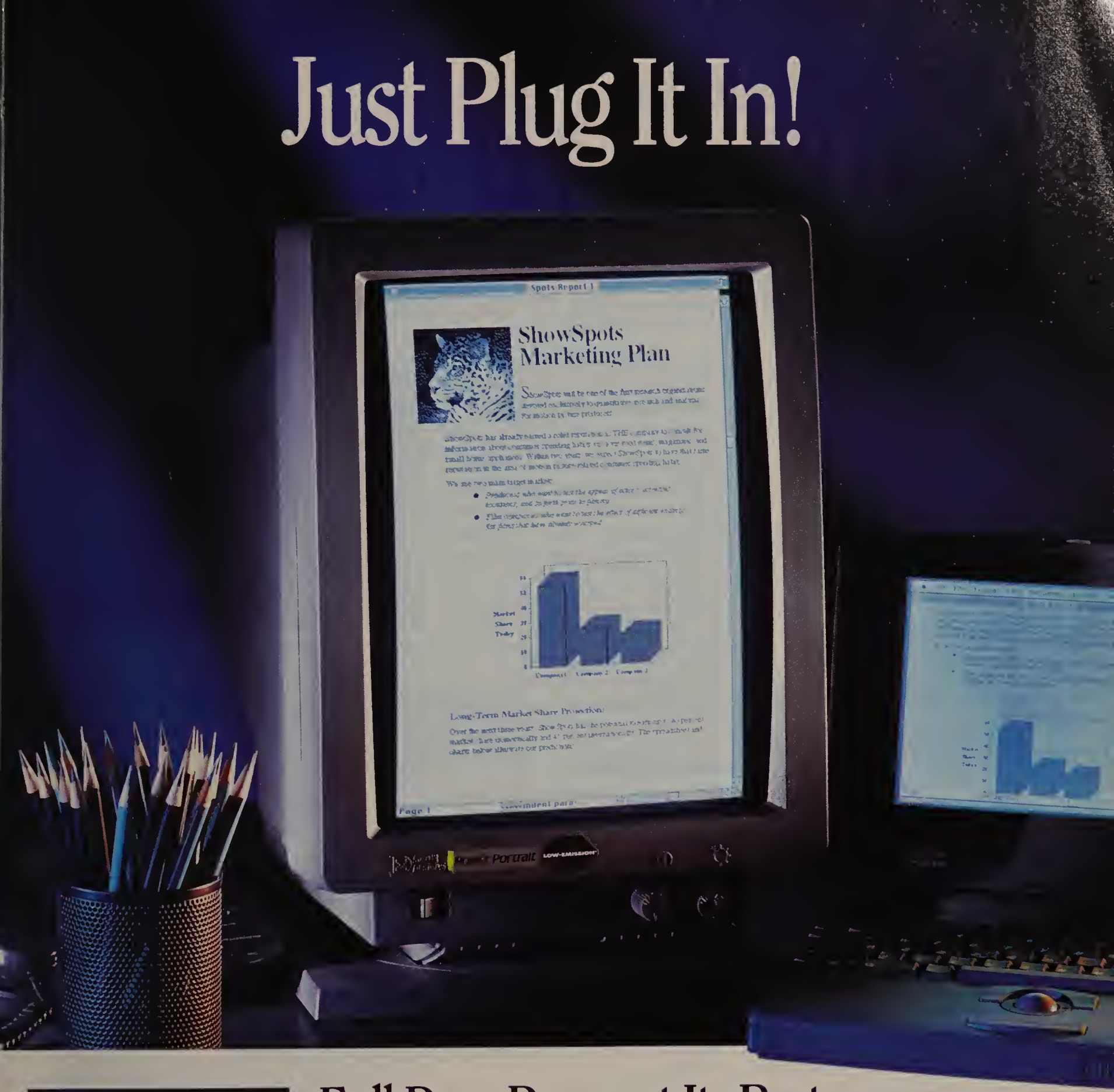

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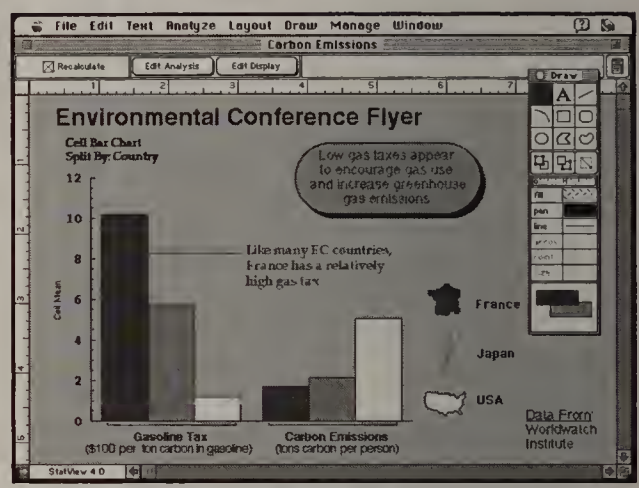

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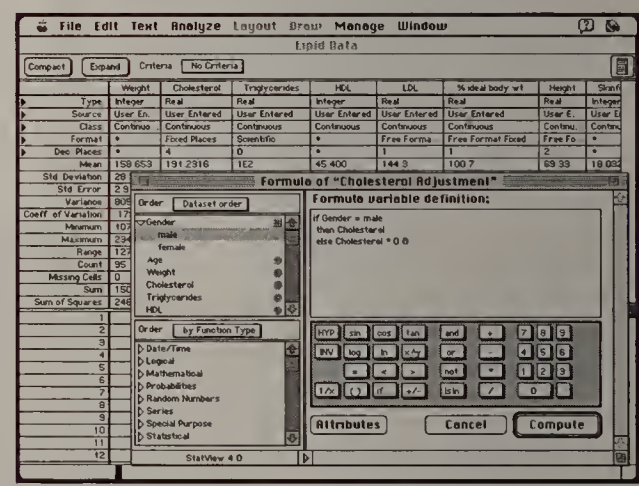

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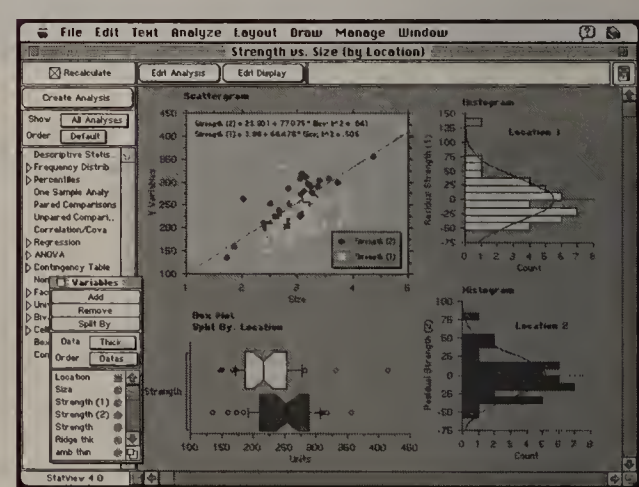

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Circle 19 on reader service card

Lab Notes

When Format Becomes Fiasco

BY TIM WARNER

WHEN OPTICAL TECHNOLOGY WAS IN its infancy, developers of rewritable optical drives recognized the need for cross-compatibility standards, which would allow any optical drive of a particular size to read from and write to any cartridge of like size. But bowing to consumers' demands for higher-capacity disks, vendors brought optical drives to market before a 650MB 5¼-inch rewritable optical standard could be finalized—and before the Macintosh was capable of managing removable-media device drivers as dynamically as it should. The result—as we discovered during our testing of 43 rewritable optical drives for this month's comparative review "Optical Update"—was the incompatibility of optical formats.

HANK OSUNA

Our troubles began with a quick test for interchangeability. After inserting 5¼-inch cartridges formatted in one optical drive into a drive from a different vendor, we encountered error messages like "Disk unreadable . . . initialize or eject?" or worse; a few times, cartridges simply ejected with no explanation.

Discussions with vendors quickly made it clear that the errors were related to formatting differences. But the conflicting information we got from vendors about whether hardware or software incompatibilities were the source of our problems led us on several wild goose chases—until we eventually discovered that incompatible device drivers were the cause of most of our problems.

Seizing a Standard

SEVERAL PROBLEMS CAN CROP UP when you try to exchange cartridges between optical drives from different companies. Incompatibilities can occur with low-level formatting, which defines physical space on the disk, and with high-level formatting, which determines where data blocks will be placed within that space. The optical drive must understand the low-level format, while the Macintosh and the device driver must understand the high-level format.

Several vendors cited low-level incompatibilities with the ISO specification (the standard that establishes the parameters within which an optical drive should operate). Because the standard was not complete until two years ago, older optical drives only partially implement the ISO standard. Today, however, these problems are rare.

When they do occur, the problems usually involve the handling of spare blocks—extra data blocks used when the physical space on the cartridge that corresponds to an existing data block goes bad. If the spare blocks are laid out on the cartridge in a way that does not conform to the 325MB specification affectionately called ISO 10089, the drive does not accept the media (the 325MB designation corresponds to only one side of a 650MB cartridge). ISO 10089 lets vendors choose from two formats, A and B, but for our purposes only A is important. Format A lets the user specify the number of bands—logical areas on the cartridge that improve data access—and the number of spare blocks in each band.

Sony included two variations of Format A in its C501 drives. Sony provides one ISO-compatible format, mode 3, and one proprietary format, mode 2. The difference between the two modes is small but crucial.

Sony's proprietary mode saves time by placing half the spare data blocks at the

continues

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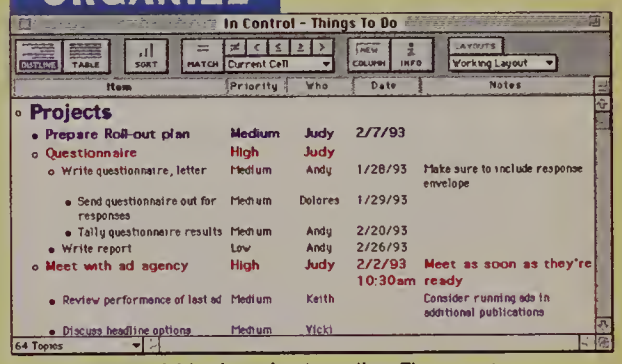

Arrange your activities in a simple outline. Then create your own columns to track the details: Priority, Due Date, Status, anything.

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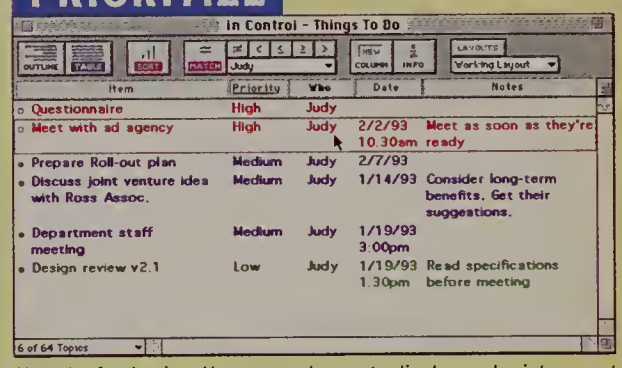

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beginning and half at the end of each band so that the read-write head needs to travel no more than half the width of a band to replace a block. However, ISO mandates that spare data blocks be placed only at the end of each band. Cartridges formatted with Sony's proprietary mode can be read only by Sony drives, and the time savings are so minimal that, according to Sony, its future drives will support only ISO formats. Outside of Sony, we couldn't find a mechanism in production today for the Mac that is *not* ISO compatible.

Dastardly Drivers

ONCE WE REALIZED THAT DIFFERences in ISO implementation at the drive level were not the major cause of conflicts, we turned to the formatting software. In the course of our testing, we found that high-level formatting problems, particularly driver conflicts, are the more common cause of interchange problems.

Typically, the process of high-level formatting includes writing a driver to the cartridge, and then writing a file directory immediately after the driver. Drivers contain information about the drive and the format of the disk, and because they vary in length from vendor to vendor, depending on how many features (such as passwords and partitions) they support, they occupy different amounts of space on the disk.

When you start the Macintosh, it looks for SCSI devices and asks each one for a driver, then loads each driver into RAM for system software use. With an optical drive, the Mac loads the driver from the inserted cartridge. Once drivers are loaded, system software assumes that they will not change. And when a cartridge or another volume is dismounted, its driver stays in memory, even though that drive is not available for use.

If another, differently formatted cartridge is inserted, the Mac uses the driver that's already loaded into memory. Because driver sizes vary, the starting point of the Mac's directory files varies. But since the old driver doesn't know anything about the new cartridge, it uses its old information about the layout of the disk, and tries to read the directory files from the wrong starting point. It's like using a ten-year-old phone book to find a long-lost friend without knowing that the phone book is out of date.

There are two ways to get around this problem. You can use a utility, such as QuikMount from MicroNet or SCSI Probe 3.4 from SyQuest, that attempts to remove the existing driver from memory and load a new one from the inserted cartridge. Or you can restart your computer. As a holdover from the days when drivers fought for the same space in memory, today's drivers are often locked against change or termination. But when you restart, everything is erased from RAM, including the driver that caused the problems, and the Mac loads the new driver into memory from the inserted cartridge. Restarting can be a pain, but it guarantees success.

Avoiding Incompatibility

ANOTHER WAY TO AVOID PROBLEMS IS to use optical drives and software from a single vendor. If all your drives come from the same company, interchangeability won't be a problem. If you use multiple mechanisms and drivers, you can standardize on a single software formatter. Generic formatting programs (such as FWB's HDT Primer 1.1) provide formatting options that meet the ISO standard. However, while generic software has certain advantages over vendor-specific formatters—such as a consistent interface and more features—there is a price to pay.

Using third-party software means that you forfeit much of the technical support available from the company that sold you the drive. Also, the read and write speeds may be affected, depending on what options you select in the software package you use. And because generic drivers are not optimized for all mechanisms, you may get poor or only fair drive performance, even if you don't try to use advanced software features not supported by the drive.

No End in Sight

THE EASIEST WAY TO AVOID FORMAT incompatibilities, without spending a lot of time reloading drivers and restarting, is to standardize on one mechanism and one formatting application among workgroups that often swap data.

Part of the confusion about optical drives among vendors and consumers stems from early incompatibilities in low-level formats. Though the trouble has thus far been confined to 650MB 5¼-inch drives, it's only a matter of time before the relentless push for higher cartridge capacities begins to cause similar formatting troubles for 3½-inch drives. But there are several other data capacities being developed (and sold) right now in the 5¼-inch size. The MaxOptix Tahiti drive is currently the only mechanism in the Mac market that reads and writes 1-gigabyte cartridges. While standards have been proposed for several capacities and formats greater than 650MB, none has been adopted yet. In the worst case, the process could begin all over again. Unfortunately, only time can tell which standard will ultimately be adopted. **m**

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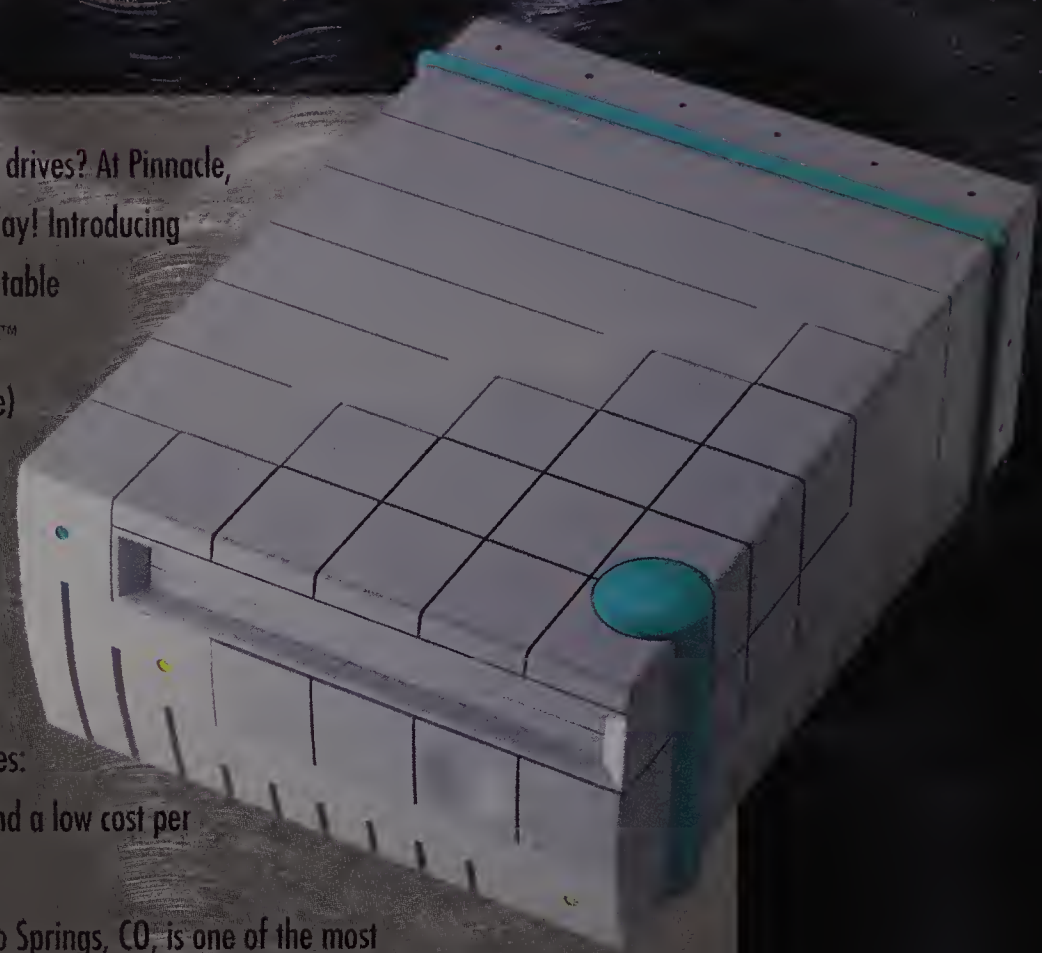

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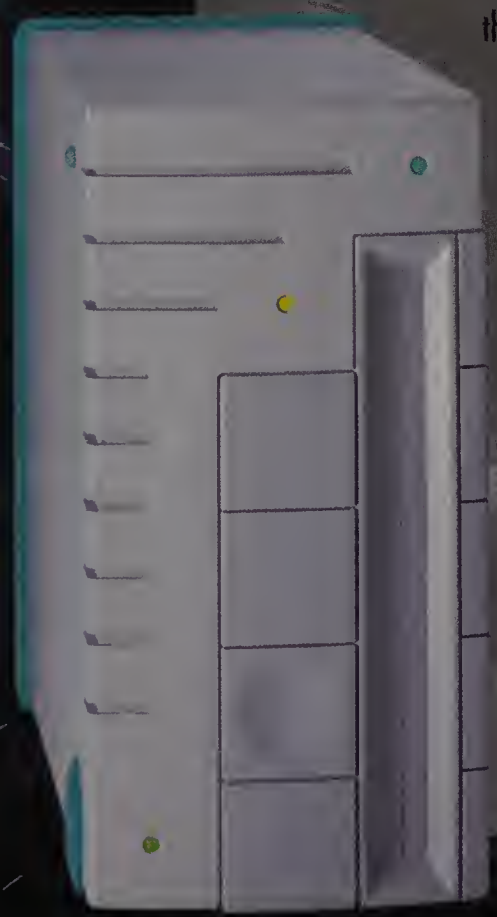

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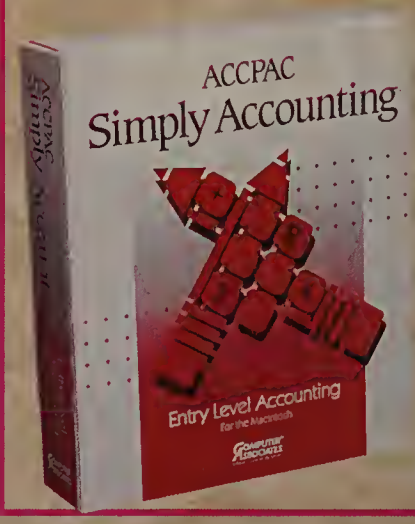
$594

1991

1/2

FrameMaker 3.0

The leading document publishing software for creating business and technical documents, FrameMaker 3.0 combines full-featured WYSIWYG word processing, graphics, page layout, equations editing, HyperText and document tools in a single, easy-to-use application. Plus, to help you get the most out of this powerful program, we're throwing in a copy of the book, Structured Publishing with FrameMaker, FREE. Frame Technology #05800



$134

Simply Accounting

Looking for a complete entry-level accounting package? Simpl Accounting contains everything you need to get up and running in a flash: a primer that walks you through basic accounting principles, understandable documentation and a complete tutorial. Computer Associates #04475

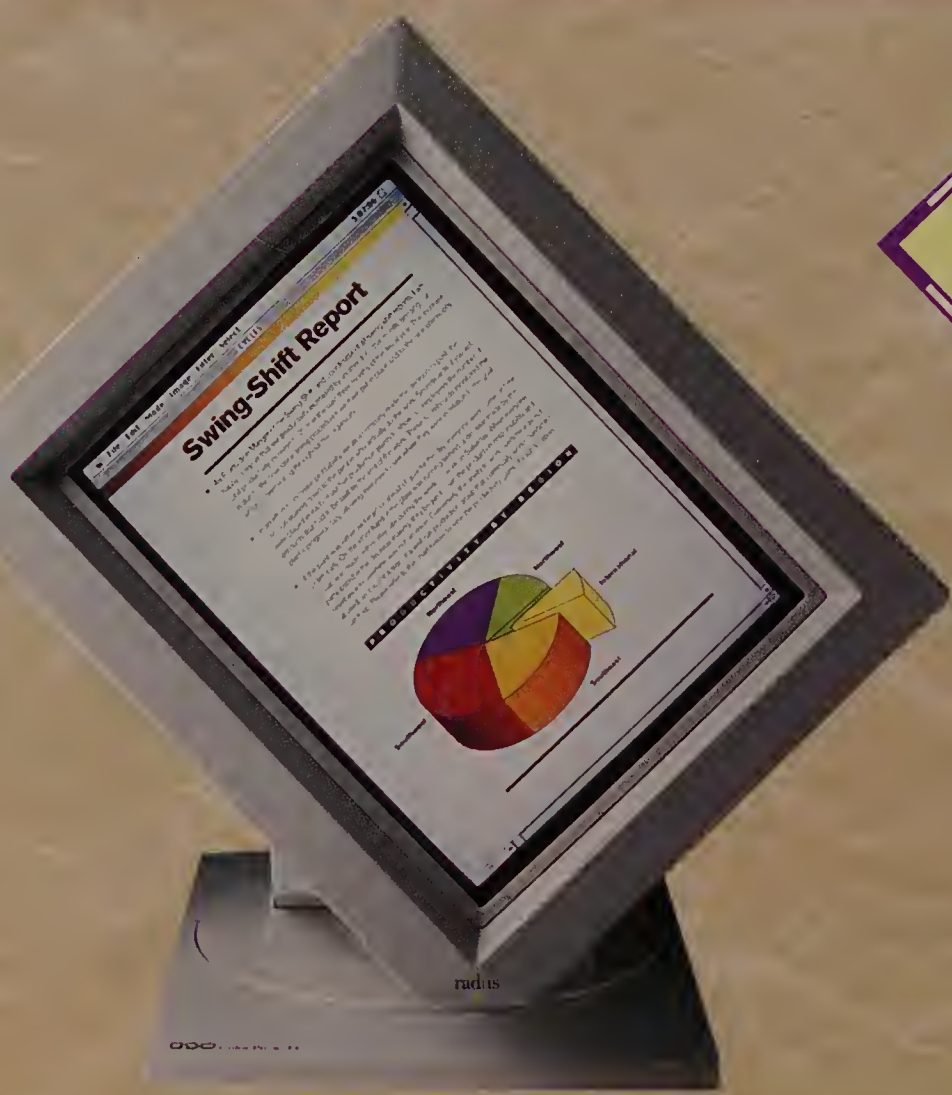
Accelerate Up Your SE

$798

TransWarp SE 25Mhz Accelerator with FPU

The TransWarp SE 030 gives you up to 10 times the speed o the standard SE. The board comes standard with a 68882 Floating Point Unit (FPU) math chip which greatly enhances the speed of any math functions, so your spreadsheets and CAD programs run faster than ever before. Applied Engineering #0432

Reach Your Full Potential With Color Pivot/LE



NEW AMAZING PRICE!

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Radius Color Pivot/ LE Display Bundle

(Includes Color Pivot interface card)

Announcing the new lower-priced Color Pivot/ LE display for your Mac. It provides nearly all the same features and functionality as the original best-selling Radius Color Pivot, but at a lower cost. The Color Pivot/LE is a great color solution when you need full 8-bit, 256 color. Bundle includes Color Pivot Interface Card. We carry the complete line of Radius monitors and cards. Call us for current pricing. Radius #05490

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Multi-tasking with today's memory-hungry applications eats up memory—*lots of memory*. System 7 alone consumes almost 2Mb! Aldus PageMaker blocks out well over 2Mb. Limited memory means limited efficiency. Increase your multi-tasking capabilities today by installing our high-quality SIMMs (Single Inline Memory Modules) and you'll never again have to quit from your spreadsheet to pluck a single fact from your database.

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Run System 7

System 7 is powerful, but you'll need 2MB of free RAM to play.

Run Powerful Applications

As today's programs gain power, they require more memory.

Run the Latest Peripherals

Run the latest technology fast with more memory.

Manage Your Time

The right time management software (and the SIMMs to run it) will pay for itself in no time.

Top-Quality SIMMs

Unlike many direct marketers of SIMMs, here at the Mac Zone we do not carry the slower 100 and 120 nanosecond (ns) SIMMs. We carry only the ultra-fast 80 nanosecond models.

Lifetime Guarantee

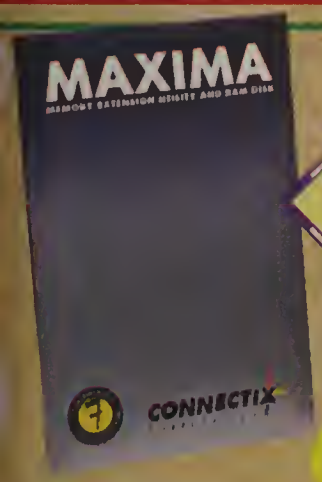
We offer a complete lifetime guarantee on all our SIMMs.

Expert Installation Toolkit

$9

Install your new SIMMs with confidence with our Expert Installation Toolkit. Performing basic Mac system maintenance and upgrades is easy if you have the right tools. The Expert Installation Toolkit includes everything you need to pop the case on your Mac: a #15 torx screwdriver, spring-loaded case cracker and a grounding strap. Install your own SIMMs! SIMMs and SyQuest #05780

#05781 The PowerBook Toolkit $24



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4x4MB SIMMs

Purchase your 4MB SIMMs upgrade now and receive MAXIMA 2.0 FREE. MAXIMA is the unique RAM enhancement utility that creates a powerful RAM disk and gives you access to large anounts of RAM without using 32-bit addressing. Connectix #05597

#04144 Maxima 2.0 ..... $44

MODEL	YOUR MAC	# OF SLOTS	MB AFTER UPGRADE	#OF KITS NEEDED	KIT #	YOUR COST
PLUS /SE	Plus	4	2	1	05653	$68
	SE	4	4	2	05653	$136
CLASSIC	Classic	2	2	1	03824	$78
* with adapter	Classic	2	4*	1	05653	$68
Classic II LC/LC II	Classic II	2	4	1	05653	$68
	Classic II	2	6	1	05655	$138
	LC/LC II	2	10	1	05656	$258
SE/30, IIsi	SE/30	8	8	4	05653	$272
	SE/30	8	16	1	05654	$498
	SE/30	8	32	2	05654	$996
	IIsi	4	5	2	05653	$136
	IIsi	4	9	1	05655	$138
	IIsi	4	17	1	05654	$498
	IIsi	4	65	4	05338	$3,112
MAC II, IIx, IIcx, IIci	II	8	8	4	05653	$272
	IIx	8	16	1	05819	$698
	IIci	8	8	4	05653	$272
	IIci	8	16	1	05654	$498
	IIci	8	32	2	05654	$996
	IIcx	8	64	8	00848	$3,992
	IIcx	8	128	8	00849	$5,584
MAC II fx	IIfx	8	8	2	05659	$138
	IIfx	8	16	1	05660	$498
	IIfx	8	32	2	05660	$996
	IIfx	8	128	8	05129	$799
POWER BOOK	PowerBook 100/140/170	1	4	1	05391	$198
	PowerBook 100/140/170	1	6	1	05392	$278
	PowerBook 100/140/170	1	8	1	05393	$368
QUADRA 700 900 950	Quadra 700	4	4	2	05653	$136
	Quadra 700	4	20	1	05654	$498
	Quadra 700	16	64	4	05338	$3,112
	Quadra 900/950	16	8	2	05653	$136
	Quadra 900/950	16	16	6	05653	$408
	Quadra 900/950	16	64	4	05654	$1,992
	Quadra 900/950	16	192	16	05338	$12,448

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Applied Engineering

00289	Cache-In (IIci Cache Card)	194	❼ ✓	
00833	QuickSilver IIsi Cache Card	198	❼ ✓	
00873	TransWarp 040	1788	❼ ✓	
03673	Quadralink	204	❼ ✓	
04072	Cache In 50 w/%	1498	❼ ✓	
04120	Fast Math LC	108	❼ ✓	
04154	Quicksilver IIsi w/%	268	❼ ✓	
04325	TransWarp SE Accel 25MHz w/%	724	❼ ✓	
04735	TransWarp SE 40 MHz w/%	1198	❼ ✓	
04903	TransWarp LC 33MHz	798	❼ ✓	
04732	TransWarp LC 33MHz w/%	998	❼ ✓	
05356	TransWarp Classic 40MHZ w/%	1098	❼ ✓	
05357	TransWarp Classic 40MHZ	894	❼ ✓	
05358	TransWarp Classic 33MHZ w/%	894	❼ ✓	
05359	TransWarp Classic 33MHZ	754	❼ ✓	
05360	TransWarp Classic 25MHZ w/%	754	❼ ✓	
05361	TransWarp Classic 25MHZ	618	❼ ✓	
05362	TransWarp Classic 16MHZ w/%	548	❼ ✓	
05363	TransWarp Classic 16MHZ	478	❼ ✓	
05380	TransWarp LC	468	❼ ✓	
05381	TransWarp LC w/%	598	❼ ✓	

DayStar Digital

00560	Equalizer LC Virtual Mem Upgr	184	❼ ✓	
00579	Equalizer LC Virtual Mem Upgr w/%	258	❼ ✓	
05003	Power Math LC	108	❼ ✓	
00561	Fast Cache Quadra700/900	278	❼ ✓	
05719	Fast Cache Quadra700/900/950	418	❼ ✓	
03729	SCSI Powercard w/o Simms	744	❼ ✓	
03730	Ram Powercard w/o Simms	464	❼ ✓	
04181	Fast Cache IIsi	298	❼ ✓	
04182	Dual Port IIsi w/%	164	❼ ✓	
05004	Combo Cache II si w/%	308	❼ ✓	
05005	Combo Cache IIsi	228	❼ ✓	
00562	Fast Cache PDS /si Fpu+ Adpt	368	❼ ✓	
05006	Fast Cache IIci (32k)	172	❼ ✓	M
02877	Fast Cache IIci 64K Ram	222	❼ ✓	
05720	SE/30 PowerCache 33MHz	608	❼ ✓	
05802	SE/30 PowerCache 33MHz w/FPU	748		
05721	SE/30 PowerCache 40MHz	844	❼ ✓	
05803	SE/30 PowerCache 40MHz w/FPU	1028		
05722	SE/30 PowerCache 50MHz	1218	❼ ✓	
05804	SE/30 PowerCache 50MHz w/FPU	1498		
04323	Univ. Powercache 33 MHz	598	❼ ✓	
04634	Univ. Powercache 33MHz w/%	744	❼ ✓	
	Powercaches must be purchased w/adapter			
04319	Univ. Powercache 40MHz	818	❼ ✓	1
04320	Univ. Powercache 40MHz w/%	998	❼ ✓	1
04321	Univ. Powercache 50 MHz	1178	❼ ✓	1
04322	Univ. Powercache 50MHz w/%	1448	❼ ✓	1
	Powercache adapters			
04549	Cache Adapter LC	44	❼ ✓	
04707	Cache Adapter IIsi	44	❼ ✓	
04708	Cache Adapter PDS (SE/30)	44	❼ ✓	
04709	Cache Adapter II	44	❼ ✓	
04710	Cache Adapter IIx	44	❼ ✓	
04711	Cache Adapter IIcx	44	❼ ✓	

Networking

Asante

00006	Asante F/Powerbooks 10 BaseT	294	❼
00020	Asante Maccon + 30IE	164	❼
00221	Asante Maccon+IIe w/64K Ram	218	❼
00228	Asante Maccon + 30 IET 64	218	❼
00327	Asante EN/SC SCSI Ethernet	328	❼
00347	Asante Person to Person 10pk	258	❼
00348	Asante 10 T Hub/12	528	❼
00402	Asante Person to Person Zonepk	458	❼
00404	Asante 10T Hub/8	258	❼
00407	Asante Person to Person 2 Pack	98	❼
00510	Asante Maccon 3 SE	218	❼
00511	Asante Maccon 3 Nubus 64K	218	❼
00820	Asante Maccon + 30 IE MC 64	314	❼
03641	Asante Maccon + II E EN	164	❼
03642	Asante Maccon + II ET 64K Ram	218	❼
03646	Asante Maccon+ 30 I ET	164	❼
03647	Asante Maccon+30Ie 64	218	❼
03945	Asante 10T MAU	84	❼
04184	Asante Maccon + 30 I ET MC64	314	❼
04334	Asante Maccon+ 30 I ET MC	258	❼
04933	Asante Maccon 3 IIsi	218	❼
05499	Thin FriendlyNet Media Adapter	84	❼
05500	Thick FriendlyNet Media Adapter	84	❼
05501	10Base T FriendlyNet Media Adapter	84	❼
05502	MacRing 4/16 MBS Token Ring Card Mac II	524	❼
05503	MacRing 4 MBS Token Ring Card Mac SE	394	❼
05504	MacRing 4/16 MBS Token Ring Card LC/LCII	394	❼
05505	MacRing 4/16 MBS Token Ring Card IIsi	394	❼
05506	12 Port Intelligent 10Base T Hub	889	❼

Dayna Communications Inc

00485	DaynaPort SCSI Link	272	❼ ✓
00487	DaynaPort SCSI Link-T	272	❼ ✓
00488	DaynaPort SCSI Link-3	299	❼ ✓
00804	DaynaPort E/Z	264	❼ ✓
00805	DaynaPort E/Si	148	❼ ✓
00806	DaynaPort E/LC	148	❼ ✓
03546	Dayna Etherprint	348	❼ ✓
04139	DaynaPort E/Z T	264	❼ ✓
04595	DaynaPort E/II-T	148	❼ ✓
04717	Daynaport E/30	148	❼ ✓
04718	DaynaPort E/II	148	❼ ✓
04911	DaynaStar Minihub	238	❼ ✓
05188	DaynaPort SCSI/Link PB	294	❼ ✓
05189	DaynaPort SCSI/Link T PB	294	❼ ✓
05190	DaynaPort SCSI/Link 3 PB	338	❼ ✓
05191	DaynaSTAR Hub-12	682	❼ ✓
05279	DaynaPORT TRX-T	86	❼ ✓
05280	DaynaPORT TRX	86	❼ ✓
05723	DaynaPORT E/SE-T	148	❼ ✓
05724	DaynaPORT E/30-T	148	❼ ✓
05725	DaynaPORT E/LC-T	148	❼ ✓
05726	DaynaPORT E/LC-A	148	❼ ✓
05727	DaynaPORT E/si-T	148	❼ ✓
05728	DaynaPORT E/II-3	198	❼ ✓
05729	DaynaPORT E/LC-FP	244	❼ ✓
05730	DaynaPORT E/LC-TFP	244	❼ ✓
05731	DaynaPORT E/LC-AFP	244	❼ ✓
05732	DaynaPORT E/si-FP	244	❼ ✓
05733	DaynaPORT E/si-TFP	244	❼ ✓

Farallon

00676	Farallon EtherMac II-TN	158	❼ ✓
00677	Farallon EtherMac II-10T	158	❼ ✓
00678	Farallon EtherMac II-C	208	❼ ✓
00679	Farallon EtherMac LC-TN	158	❼ ✓
00680	Farallon EtherMac LC-TN + FPU	248	❼ ✓
00681	Farallon EtherMac LC-10T	158	❼ ✓
00682	Farallon EtherMac LC-10T+FPU	248	❼ ✓
00683	Farallon EtherMac LC-C	208	❼ ✓
00684	Farallon EtherMac LC-C+FPU	298	❼ ✓
00685	Farallon EtherMac 30i-TN	188	❼ ✓
00686	Farallon EtherMac 30i-TN+FPU	278	❼ ✓
00691	Farallon EtherMac 30i-10T	188	❼ ✓
00692	Farallon EtherMac 30i-10T+FPU	278	❼ ✓
00693	Farallon EtherMac 30i-C	238	❼ ✓
00695	Farallon EtherMac 30i-C+FPU	328	❼ ✓
00696	Farallon EtherMac SE-C	208	❼ ✓

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PowerBook

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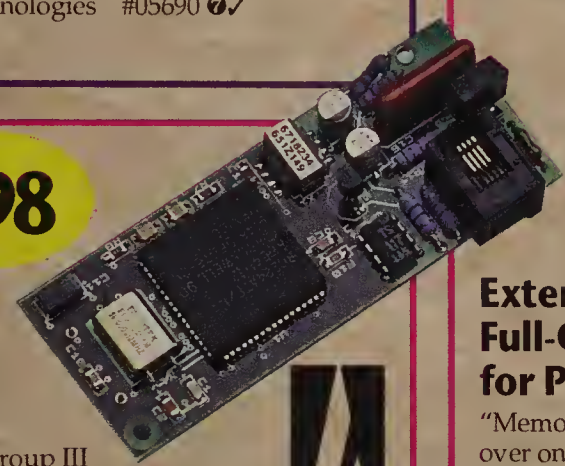
$86

PowerMerge

PowerMerge solves the problem of keeping track of changes made to your files while working on your PowerBook, and whenever your two machines are brought together, PowerMerge will automatically update the older version of the file to the most recent version. Leader Technologies #05690 ✓



$198

PowerModem 24/96 SR Internal

Make your Mac work harder for you with the unbelievably affordable PSI PowerModem. The PowerModem is not only an internal send/receive fax modem, it's also a 2400bps Hayes-compatible data modem. The fax is Group III compatible, sends at a full 9600bps and receives transmissions at 4800bps. PowerModem will dramatically improve your PowerBook's performance. It lets you continue to work in any application while its intuitive software performs in the background. PSI #04948

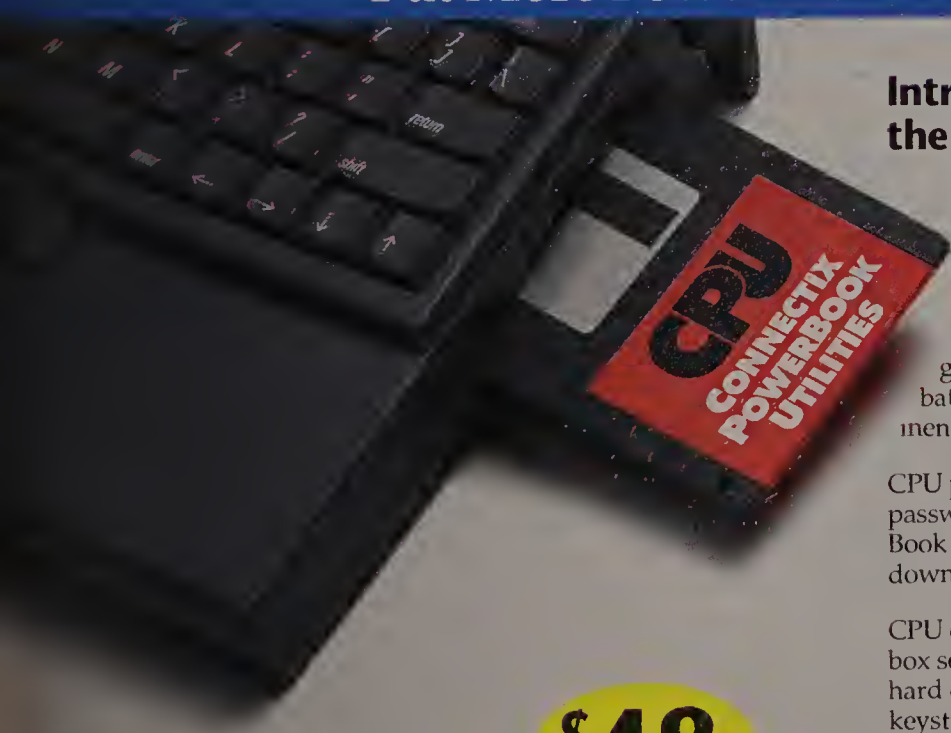
PSI

$158

External Full-Cycle Battery Charger for PowerBooks 140/170

"Memory effect" is the loss of battery capacity due to using a battery over only a portion of its storage range. Since the PowerBook automatically shuts down on low battery, the battery is never used over its whole range, so it won't develop a memory effect. The Lind External Full-Cycle Charger not only charges the PowerBook 140/170 ni-cad battery but optimizes full performance and long life by giving you the option to discharge the battery completely before the charging cycle begins. Lind Electronic Design #05354

Put More Power into Your PowerBook



$48

Connectix PowerBook Utilities

This "aggressively priced package" (MacWEEK 6/92) is "the first utility program to help conserve power and manage security on PowerBooks" (InfoWorld 7/92). CPU provides all this and over a dozen other controls, including Instant-Wake, Cursor Finder, Battery Manager, and the unique LCD Screen Saver. Connectix #05646

Introducing Connectix PowerBook Utilities: the first software utility created exclusively for the PowerBook

The world's best-selling notebook computer just got better! Now you can get even more productivity out of your PowerBook™, with Connectix PowerBook Utilities (CPU™).

CPU's intelligent PowerManager™ extends your battery life. It gives you control over power consumption, and displays accurate battery status, time remaining and other key information in the menu bar. CPU keeps your PowerBook up and working longer.

CPU protects your sensitive data. The innovative graphic and password security keeps your information safe. When your PowerBook is unattended, your files are secure, whether it's running, shut down or asleep.

CPU offers unmatched convenience. Choose menu items and dialog box selections directly from the keyboard. You can spin down the hard disk, adjust the backlight, invoke security or sleep with a single keystroke.

Designed exclusively for the PowerBook, CPU instantly adapts to your changing environment. A flexible menu of personal settings like Home, Office, Travel, Meeting or Power Saver lets you work more efficiently. CPU even adjusts yoursettings automatically between battery and AC power use.

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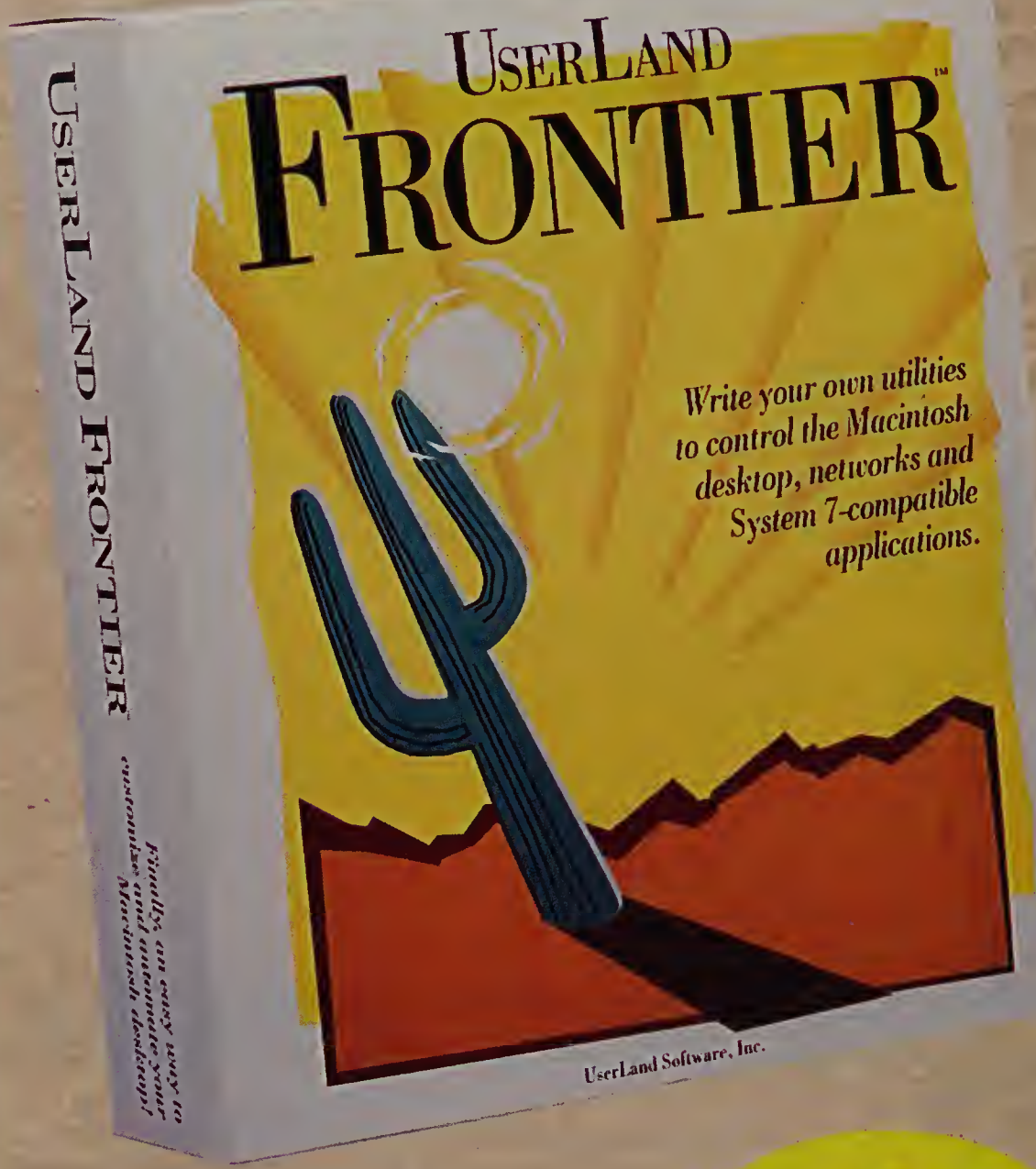

$184

Finally, an Easier Way to Customize and Automate Your Macintosh Desktop.

UserLand Frontier

UserLand Frontier gives you the power you need to turn tedious, error-prone desktop clicking and dragging tasks into efficient scripts that help you get more work done, more accurately, in less time. If there's a tedious and repetitive job you have to do, write a Frontier script to do it automatically while you're at lunch!

UserLand Frontier is the first scripting software that allows you to write your own desktop utilities to customize, automate and simplify your Mac. With it you can write your own utilities to control your Mac desktop, networks and System 7-compatible applications.

If you can code a macro, you can write a Frontier script that customizes or modifies your desktop to fit your specific needs. Or, if you have experience writing HyperTalk scripts, dBASE applications, MS-DOS batch files or Unix shell scripts, so much the better. The more experience you have programming, the more power you'll get from Frontier. It's a gutsy, powerful programming language that won't limit the creativity of professional C and Pascal developers.

UserLand Frontier is priced like a utility, but it's actually a platform for utilities. You can write your own scripts, modify the sample scripts that ship with the product, or download scripts from electronic services like CompuServe and AppleLink. The FREE sample scripts alone are well worth the asking price! Userland #05323

- **Frontier Scripts** are easy because they're outlines. Collapse details to get the big picture. Reorganize whole sections of code with a single command. Scripts that live on the Finder desktop are called "desktop scripts." Double-click on the icon to run the script. Hold down the cmd-key to edit the script's source code.
- **The Menu Bar Editor** lets you edit the menu bar! Change command names and keystrokes, reorganize the menus so the commands you use most often are easy to reach for. Because the menu editor is hot-wired, your changes are immediately reflected in the Macintosh's system menu bar.
- **The Object Database** stores small objects like a user's name, or the time you last did a backup. Or larger objects like a list of users, a standard form letter, or a sub-table of electronic mail accounts. The Object Database is a permanent data structure, so you don't have to worry about complicated file formats for your scripts. Great for network server applications!
- **The Quick Script Window** is Frontier's command line. Type one-line scripts to launch applications, copy and delete files, manage your Macintosh network.
- **Full Scripting Language**. Frontier's scripting language, UserTalk™, is a no-compromise yet streamlined programming language, allowing full logic, looping, case statements, sub-scripts, local variables and special constructs with over 350 built-in verbs to give users new power to automate and customize the Macintosh. It's easy to get started scripting with Frontier, but you'll have the depth you need to grow.
- **The Menu Bar Editor**. Frontier lets you edit its menu bar! Change command names and keystrokes, reorganize the menus so the commands you use most often are easy to reach for. Because the menu editor is hot-wired, your changes are immediately reflected in the Macintosh's system menu bar.

System Requirements

- Any System 7.0-capable Macintosh.
- 1024K RAM.
- A hard disk.
- System 6.0.5 or higher. Interapplication and networked messages available only on System 7.0 or higher.
- Compatible with AppleShare System 7.0 File Sharing.
- Prints on all LaserWriter and ImageWriter compatible printers.

CODE 21102

Computing Solutions

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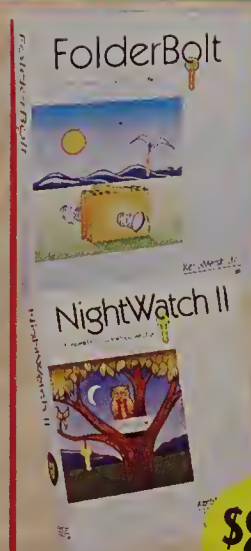
$46

SpeedyCD

Access CD-ROM drives at lightning-fast speeds! SpeedyCD is an amazing Macintosh control panel that allows you to access your CD-ROMs as quickly and easily as you access your hard disk. It actually speeds up operations such as opening windows or finding files by as much as 700%! SpeedyCD works with System 6, and is fully System 7 Savvy. Under System 7, it speeds up all finder operations. ShirtPocket Software #05158



$72

FolderBolt and NightWatch II

Protect your valuable and confidential data from security breech with quality software products from Kent Marsh Ltd. With FolderBolt you can create completely locked folders, read-only folders, or password-protected drop box folders. No one without the password can open, duplicate, delete or move them. NightWatch II is the perfect solution if you wish to limit access to your entire hard disk. It offers hard disk protection while you're away and screen security while you work.

#00258 FolderBolt $72
#04981 NightWatch II $88

$88

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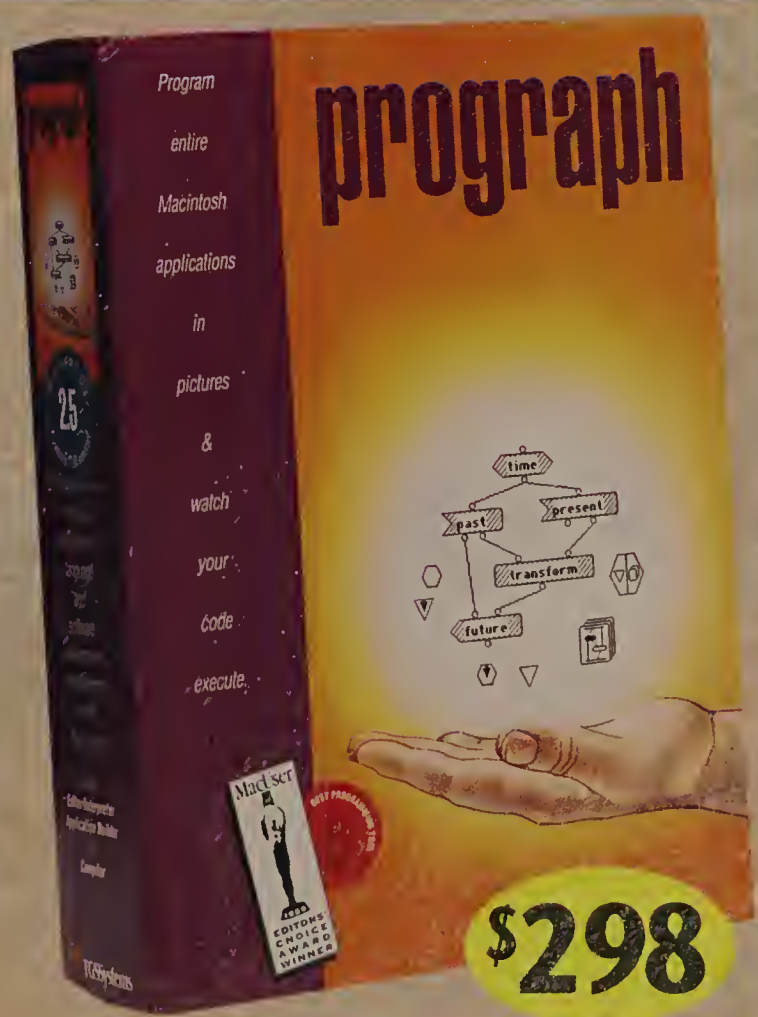

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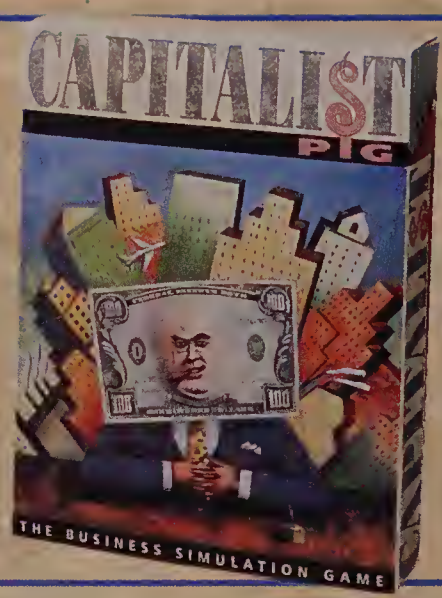

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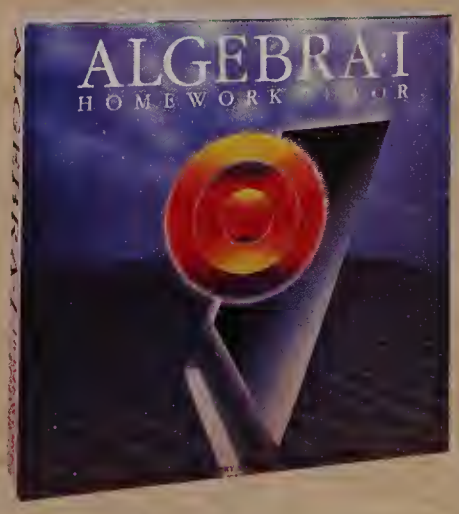

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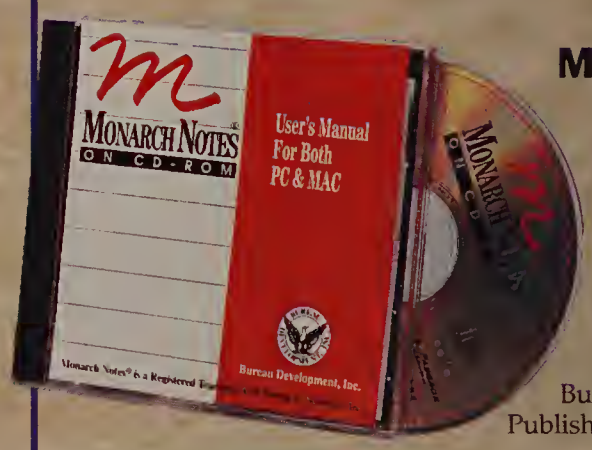

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Maxell MC-2120	120MB	04973	20
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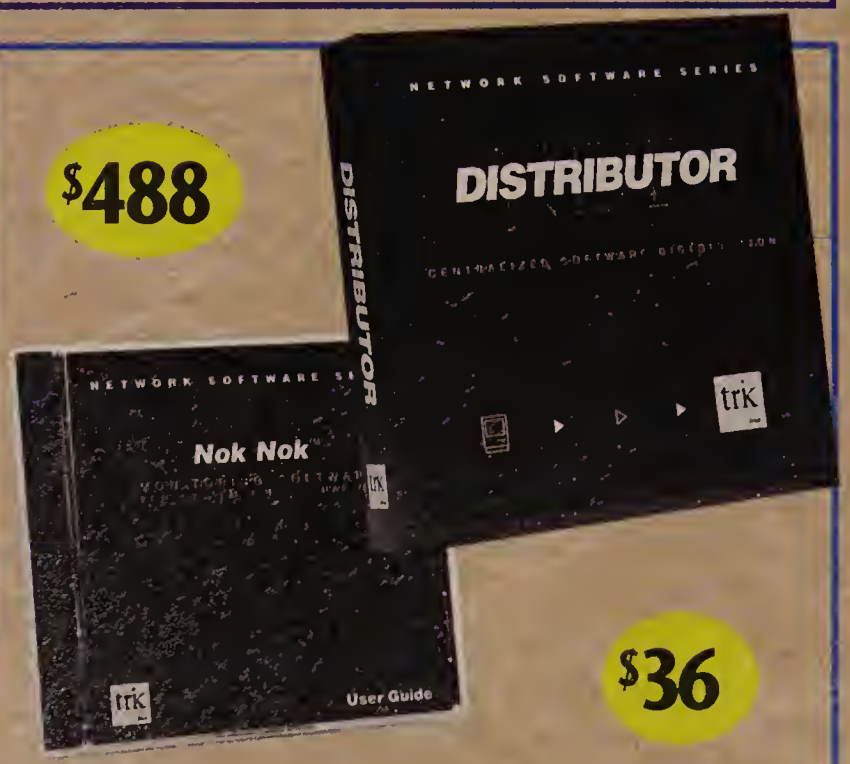
Retrospect

Retrospect is automatic, unattended backup for a single Macintosh to tape, cartridge or optical. Set it up once, and a calendar backs you up again and again. Retrospect also saves hard disk space by archiving seldom used files to the backup media for future retrieval. Retrospect Remote brings the power of Retrospect to an entire AppleTalk network.
Dantz #02586



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$36

Nok Nok and NetDistributor Pro

Trik makes network management easy with two must-have network solutions.Keep track of who is attempting to connect to your Mac via System 7 file sharing with Nok Nok. Nok Nok senses when someone is logging on, reads the user and machine identity and lets you know who it is. NetDistributor Pro installs software updates, including applications, fonts and desk accessories, anywhere and anytime to networked Mcintoshes across LocalTalk, EtherTalk, TokenTalk and WAN links.

#05042 Nok Nok $36
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Circle 162 on reader service card.

MACWORLD News

THIS MONTH:
Adobe Premiere 2.0
Ungermann-Bass
Compaq Printers

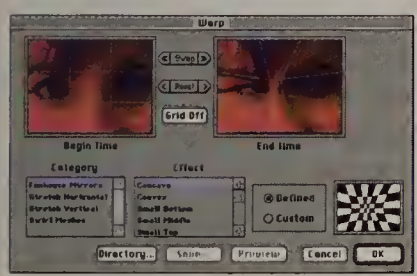
BY DAN LITTMAN AND TOM MORAN

Baker's Dozen

THE COMMON SAYING "six of one and half a dozen of the other" is about to take on new meaning thanks to Morph, a little program that can mix two images into one. You can open scanned photographs of people from inside Morph, define some common points in each image (for example, the tip of the nose, the center of the eyes, the earlobes), and let Morph output a QuickTime file of one face melting into another, or still images showing the faces at different stages of merging. Morph can also merge images of inanimate objects. Morph is $149 from Gryphon Software, 619/454-6836.—D.L.

WOULD YOU VOTE FOR THIS MAN? MORPH EXPOSES THE DILEMMA FACING AMERICAN VOTERS IN NOVEMBER.

GRYPHON SOFTWARE. JOHN BARRETT: CLINTON / CARL STEFFEN: BUSH



ONE OF HUNDREDS OF USEFUL OR FUN SPECIAL EFFECTS THAT VIDEOFUSION CAN IMPOSE ON QUICKTIME MOVIES.

New Tools for QuickTime

Adobe's QuickTime movie-editor Premiere is being upgraded to version 2.0, and start-up VideoLake is developing VideoFusion, a QuickTime special-effects package.

Premiere 2.0 adds support for device control and SMPTE time code and can export edit-decision lists. Premiere can create transition effects; save files in Filmstrip format for editing in Photoshop; and map channels to other movies. Premiere 2.0 lists for $695. Adobe, 415/961-4400.

VideoFusion provides a wide range of special effects including geometric distortion of images; panning, zooming, and rotating images in three dimensions; compositing movies using channels or moving mattes; and special color controls. A script view works with WordPerfect. VideoFusion lists for $795. VideoLake, 419/891-1090.—D.L.

Compaq Printers for the Mac

COMPAQ CORPORATION, long the stronghold of IBM clonedom, has brought out its first printers—network devices that, somewhat surprisingly, come in versions for the Mac. Called the Compaq PageMarq 15 for Macintosh and PageMarq 20 for Macintosh, the printers produce 15 ppm and 20 ppm, respectively, have multiple interfaces simultaneously active, include PCL (for DOS machines) and PostScript Level 2, and can sense which of those two formats a file is in. The interfaces include a serial port, a parallel port, and an AppleTalk connector.

THE PAGEMARQ 20 (SHOWN) AND THE PAGEMARQ 15 ARE COMPAQ'S FIRST PRINTERS AND FIRST MAC PRODUCTS.

SEAN SULLIVAN

Both products can print at up to 800 dpi by 400 dpi, have high-speed RISC processors, and provide high paper capacities. Both come with 4MB of RAM, expandable to 18MB for the PageMarq 15 and 20MB for the PageMarq 20. An optional multipurpose sheet feeder will also be available for both. Another option provides for an internal fax modem for either printer.

The PageMarq 15 will list for $4199 and was slated to ship in September. The PageMarq 20 will list for $5699 and was also expected to be available in September. Compaq, 713/370-0670.—T.M.

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Circle 240 on reader service card

News

Fast Serve

SHIRTPOCKET'S PYTHON, AN 80486-BASED APPLESHARE-COMPATIBLE SERVER CAPABLE OF KEEPING AN ETHERNET BUSY.

If your AppleShare server feels a little poky on that new Ethernet network, take a look at ShirtPocket Software's two AppleShare-compatible EasyServers.

Both EasyServers use Intel processors. The $2600 Viper is based on a 40MHz 80386 with 4MB of RAM, of which 3MB are devoted to disk caching; and the $4800 Python is based on a 50MHz 80486 with 16MB of RAM, 15 used for disk caching. Both boxes include Ethernet and SCSI hookups, but the user must supply a fast Mac-compatible hard drive. ShirtPocket claims the Python can pump out about 8MB of data per second—enough to saturate an Ethernet network. The company also sells a kit for systems integrators. ShirtPocket, 602/966-7667.—D.L.

Medical Odyssey

RESEARCH BY internists at the University of Utah Medical School has led to the development of Iliad, a system that is intended to take the guesswork out of diagnosing illness.

Using Iliad in Consultation mode, a doctor enters symptoms and then steps through a series of questions to home in on a possible diagnosis. Using Critique, a doctor enters a diagnosis or hypothesis and Iliad requests information to confirm or refute it. Browse provides access to a database of medical literature, and the Simulation mode presents imaginary cases for training medical students.

Iliad is $995 for physicians and $450 for students. Applied Informatics is also developing Iliad Pro, a system for authorizing surgery that will be marketed to insurance companies, HMOs, and other similar organizations. Applied Informatics, 801/584-3060.—D.L.

GWENDOLEN CATES

JAMES GAGNÉ, M.D., RUNS A FAMILY PRACTICE IN GLENDALE, CALIFORNIA. GAGNÉ USES ILIAD TO HELP BUILD DIAGNOSES.

TREND

MacinStor Speed Array

The MacinStor Speed Array from Storage Dimensions is a RAID Level 0 disk array that's designed for very fast access to data and can support up to seven hard drives at once. The Speed Array is intended for publishing, multimedia, and other disk-intensive applications. It uses a Fast SCSI-2 controller and Storage Dimension's disk-control software to achieve effective seek times of less than 2ms and sustained data-transfer rates up to 9MB per second, according to the company.

The Speed Array systems range in capacity from 1GB to 8.12GB when using from two to four drives. The same systems range in list price from $7559 to $37,099. Speed Array will be available on September 15 in a Quadra-only version, with support for Macintosh II systems due in the fall. Storage Dimensions, 408/954-0710.—T.M.

Speeding Up the Quadra 950

DayStar Digital has announced a cache card for the Quadra 950 called the FastCache Quadra. The card can increase the performance of the 950 by up to 40 percent, depending on the application, according to DayStar. The FastCache Quadra also works with the Quadra 700 and 900. The card has a list price of $449. It is currently shipping. A previous version that works with the Quadra 700 and 900 is available for $299.

DayStar also announced new adapters that let its Universal PowerCache CPU accelerator board work with the Mac Classic and SE. The Universal PowerCache can now work in ten different Macintosh models, usually with an adapter designed for the individual Mac model, which means that users can move the board to their new system if they decide to upgrade to a more powerful Mac. The new adapters have a list price of $49 and were expected to be available in October. The Universal PowerCache starts at $479 and goes up to $1559, depending on the clock speed of the 68030 processor and whether a math coprocessor chip is added. DayStar, 404/967-2077.—T.M.

AN ILLUSTRATION CREATED WITH DENEBA'S NEW ARTWORKS, SHOWING DRAW AND PAINT OBJECTS ON THE SAME LAYER.

Deneba's New Niche

Perceiving an empty market slot for a low-price drawing package, Deneba is revamping UltraPaint and changing its name to Deneba ArtWorks.

ArtWorks provides both draw and paint tools, and both can operate on the same layer. Files can have unlimited layers. ArtWorks provides Bézier curves; transparency controls for both paint and draw objects; a simplified way of creating masks; and blends and gradient fills. It has image-editing tools and allows nonprogrammers to experiment with creating new filters. It will list for $149.

Deneba is also developing add-on modules for its high-end drawing package Canvas, including one for pressure-sensitive tablets. Deneba, 305/596-5644.—D.L.

DESKTOP LIBRARIAN

Books for First-Time Mac Buyers

This month we scan two slim volumes for those just starting out with personal computers and wondering what to buy.

- *Understanding Computers*, by Nathan Shedroff, J. Sterling Hutto, and Ken Fromm (1992, $15.95). This book, designed for the beginning to intermediate user, is full of useful illustrations and explanations of the way computers work and the ways they are most often used. Written so that the reader can browse without having to plow through every detail, the book includes sections on uses, components, technology, and evaluation. The last section starts by helping you figure out your computer needs, and then discusses what to buy, where to buy, after you buy, and repairs. Includes a glossary/index. Sybex Computer Books, 510/523-8233.
- *Which Macintosh Should I Buy?*, from BMUG (1992, free). This 32-page booklet from BMUG basically assumes (quite properly!) that the reader has decided to purchase a Mac, and leads the way through the process of choosing a specific model. It starts with a few pages that ask what you'll be doing with the Mac, and lists the models that might be appropriate. Then it proceeds with a discussion of each Mac, including some specifications and a short description of the "right user" and the "wrong user" for each. Includes a glossary. BMUG, 510/549-2684.—T.M.

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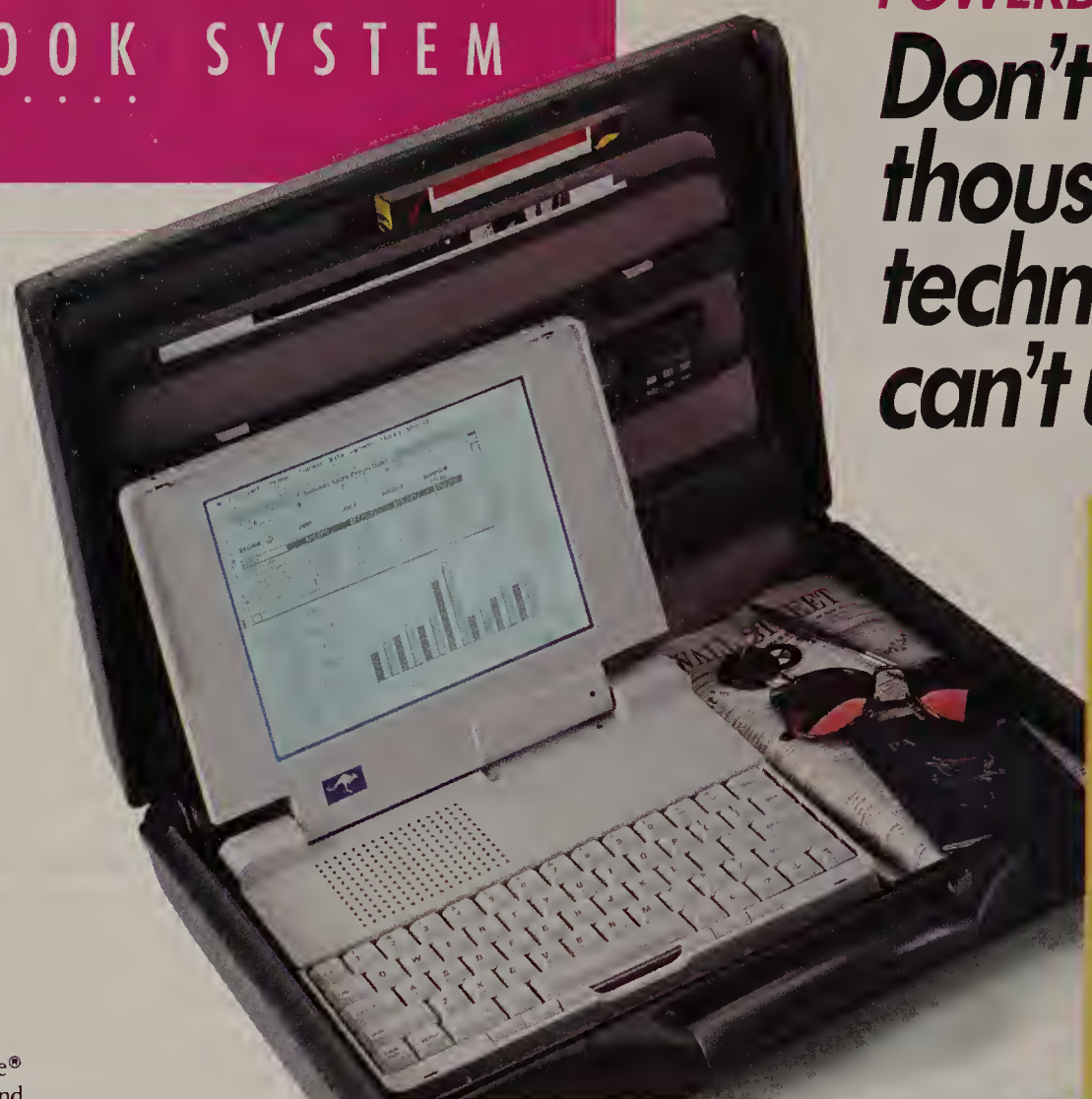
WHICH MACINTOSH SHOULD I BUY? AND UNDERSTANDING COMPUTERS.

NOTEBOOK SYSTEM

THE OUTBOUND



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MacUser Magazine

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Portable Office Magazine

"*For me, the Outbound Notebook is the better choice.*"
BYTE Magazine

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User Interchangeable Hard Drive	YES	No	YES	No	YES	Not Available
Internal Floppy Standard	YES	Yes	YES	Yes	YES	Not Available
Processor Speed	68030 25MHz	68030 25MHz	68030 25MHz	68030 25MHz	68030 33MHz	Not Available
Maximum Hard Drive Available	220MB	80MB	220MB	80MB	220MB	Not Available
Full-size Silent Keyboard and True Notebook Size	YES	No	YES	No	YES	Not Available
Maximum RAM Available	4MB	8MB	14MB	8MB	14MB	Not Available
Math Coprocessor	Optional	No	Optional	Yes	Optional	Not Available
Price	$1999 2035/440 4MB RAM 40MB HD	$2399 145/440 4MB RAM 40MB HD	$2399 2030E/440 4MB RAM 40MB HD	$4299 170/440 4MB RAM 40MB HD	$2799 2030S/440 4MB RAM 40MB HD	Not Available

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Circle 23 on reader service card

SnapBack Backup

GOLDEN TRIANGLE'S SnapBack is a hard drive backup utility that's highly customizable, works over an AppleTalk network, and provides individual UserSpace interfaces for each user. The user clicks on a button in the SnapBack window to access the UserSpace, a customized list of files and folders that have been (and should be) backed up. The UserSpace then mounts from a central server, where up to 100 UserSpaces are stored. Files or folders can be labeled with different colors, and backup procedures can be specified by color. Once the backup criteria are set, SnapBack performs the actual backups at the user-specified intervals.

SnapBack is available now and lists for $129 for the StarterPack, which supports the server and three users. Six or 12 users can be added for $229 and $329, respectively. Golden Triangle, 800/326-1858.—T.M.

VIRUS WATCH

CURRENT VIRUSES, TROJAN HORSES, AND WORMS

T4-A, T4-B

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 10/92
INFO: Initially discovered in a game called GoMoku
IMPACT: Both versions of T4 damage system files and applications

ChinaTalk

TYPE: Trojan Horse
FIRST LISTED IN VIRUS WATCH: 10/92
INFO: ChinaTalk is an INIT that comes with a Read Me file claiming it provides a female voice for MacinTalk
IMPACT: Deletes the contents of your disk drive upon restart

INIT 1984

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92
INFO: Infects INITs; becomes active only on Friday the 13ths
IMPACT: Destroys files and changes file and folder names and attributes to random garbage

Code 252

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92
INFO: Displays a message telling user it is destroying contents of hard drive
IMPACT: After displaying message, it deletes itself without causing damage. Infected Macs may behave erratically

PAUL BERG

COLORWORKS PROJECTION PANELS FROM PROXIMA CAN DISPLAY MORE THAN 24,000 COLORS.

High-Quality Color LCD Projection

Proxima Corporation has brought out ColorWorks, a series of relatively inexpensive color LCD overhead projection panels that produce high-quality images. The ColorWorks A502C has a 9-inch LCD panel, while the ColorWorks A522C has an 11-inch panel for producing larger images. Both can produce 24,389 colors and have a contrast ratio of 20:1.

The A502C lists for $3995. The A522C lists for $4995 including presentation utility software. Both devices come with a wireless remote control and cables for Mac II's and DOS machines. The two panels are shipping now. Both are compatible with Proxima's Cyclops attachment, which allows the user to "click" on the displayed desktop or other image with an infrared pointer. Proxima, 619/457-5500.—T.M.

ROBERT HOLMGREN

ROCKWELL'S CORINNE RUOKANGAS USES DEMOS TO MODEL COST SCENARIOS OF MAINTAINING SPACE SHUTTLE TILES.

Decision Maker's Companion

Demos is a simulation package that combines the system-modeling capabilities of Extend or ithink with the uncertainty analysis of @Risk or Crystal Ball. In Demos you draw a flow chart, or influence diagram, of factors affecting your system (diagrams can be embedded within diagrams). Each factor can be a function, a list, or a multidimensional array. Like @Risk and Crystal Ball, Demos provides Monte Carlo and Latin Hypercube support for working with uncertain factors and performs importance analysis to determine which uncertain factor contributes the most to the uncertainty of the result. Demos supports Apple events and has an internal programming language.

Lumina Decision Systems is marketing a $600 "early-adopter" version of Demos. Pricing for version 2.0, the first commercial release, is not set. Lumina, 415/327-4944.—D.L.

News

For PowerBook Owners

AFTER HOURS Software's GUM (Guy's Utilities for Macintosh) supplements Apple's PowerBook management features. GUM lets users set how long the drive waits to spin down for each application; checks for presence of a network and turns AppleTalk on or off appropriately; can shut down in the middle of booting (for use after showing airport guards that your PowerBook isn't a bomb); and prevents users from accidentally setting caps lock on. GUM also has a utility for synchronizing the contents of the PowerBook's drive with a desktop Mac's drive. GUM lists for $99. After Hours Software, 818/780-2220.—D.L.

TREND

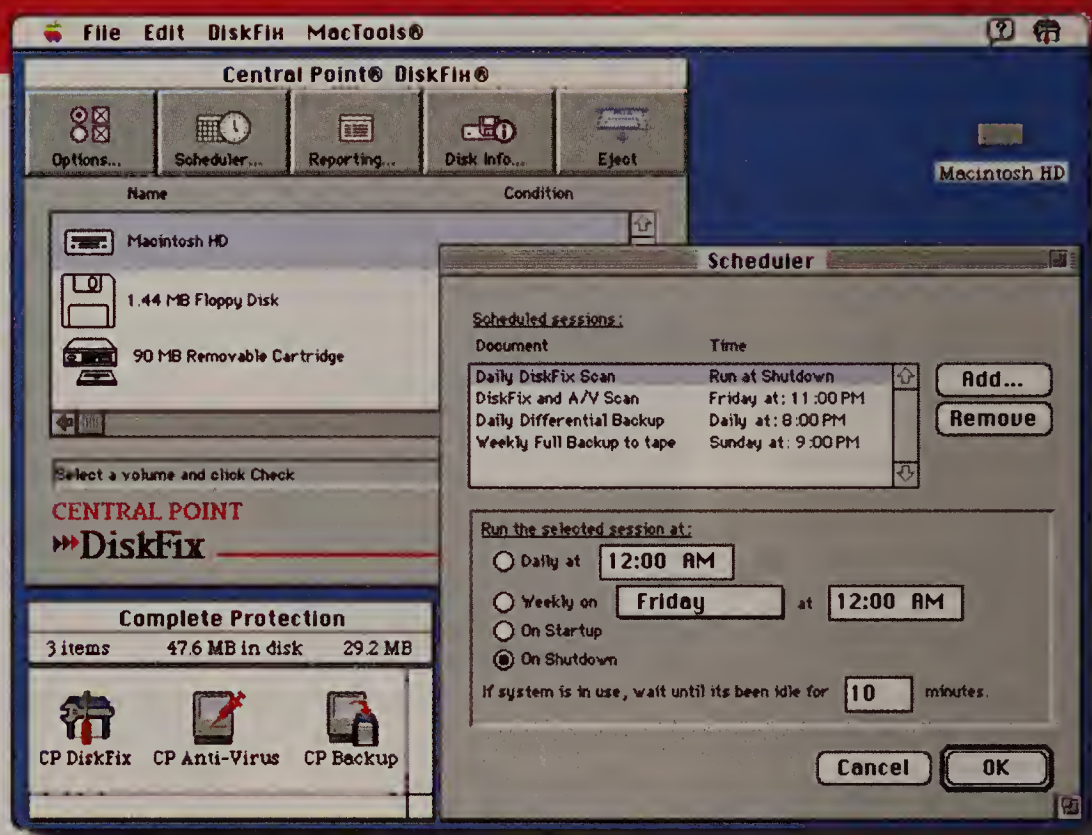
Music Bank

LOURDES LIVINGSTON

In the age of QuickTime, it's hard to know what sounds and moving images you can and cannot legally appropriate for that snazzy presentation or awesome E-mail. To address the sound part of the legal equation, The Music Bank has put together Stingers, a CD ROM that contains 98 professional-quality music clips that anyone can include in a presentation or a commercial product without having to worry about further licensing.

The CD ROM includes the music clips in several formats for different personal computers, including 22kHz AIFF/SND format for the Mac. Stingers runs the gamut from country-and-western to classical, with introductory themes, transitions, and sound effects as well. The company expects to release a series of other music CD ROMs, with each disc specializing in one kind of music. Stingers lists for $99 and is available now. The Music Bank, 408/867-4756.—T.M.

New MacTools® 2.0. The First Data Protection That's Automatic.



PROTECT AND REPAIR DATA WITHOUT EVER HAVING TO THINK TWICE.

MacTools® 2.0 is the first automatic data protection program with integrated virus protection, backup and data recovery.

And to make sure that today's minor disk problems don't turn into tomorrow's disasters, MacTools is the only data protection package that offers scheduled disk analysis and repair.

New MacTools automatically detects and removes known viruses and protects your computer from unknown viruses.

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Tracks Deleted Files

ANTI-VIRUS

Automatic Detection
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Automatic Protection
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$59* COMPETITIVE UPGRADE

When it's time for you to backup, MacTools can use tape or network drives at the times you schedule. And it will even remind you to back up to disks.

MACTOOLS 2.0 HELPS MAKE EVERY MANAGER'S JOB A LITTLE EASIER.

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The rest is automatic.

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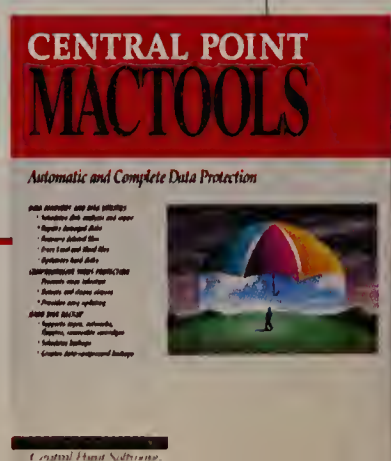
Central Point Software Inc.®



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*Plus $6.00 shipping and handling.

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Circle 275 on reader service card

TREND

RACHEL LEVENTHAL

ONE OF THE WEARABLE COMPUTER COMPONENTS DESIGNED AT NYU FOR APPLE'S HUMAN INTERFACE GROUP.

Digital Wear

MACS HAVE ALWAYS had a certain cachet, but in the future they may be part of a fashion statement fit for the pages of *Vogue*. Having funded the Wearable and Portable Computers Design Project at New York University's Interactive Telecommunications Program, Apple now has first rights to commercialize student designs for a camera hat, a microphone earring, and a watch that activates both with an infrared sensor. The images and audio would be recorded on credit card–size disks that would slide in and out of the watch (a *large* watch), an electronic daybook, and a special slot on future Macs. "Wearable computers could be in Apple's future," says Joy Mountford, manager of Apple's Human Interface Group, "and I don't want to wear something geeky."
—ANN GARRISON

High-End Monitor

BARCO has introduced the Megagraphics, a high-resolution, 29-inch, color-calibrating monitor designed for high-end DTP and related applications. The monitor can support resolutions ranging up to 1600 by 1200 pixels, but requires a graphics adapter also capable of driving that resolution. Because it is more than big enough to show two full-size color pages next to each other, the Megagraphics monitor can increase the efficiency of a designer by up to 40 percent, according to Barco.

Special features include dynamic astigmatism focus, which reduces dot distortion in the corners of the screen. The Megagraphics comes in a desktop version and a chassis version, which is intended to resist harsh conditions. The monitor is shipping now at a list price of $19,995. Barco, 404/590-7900.—T.M.

JOHN WILLIAM LUND

BARCO'S MEGAGRAPHICS MONITOR MEASURES 29 INCHES DIAGONALLY AND OFFERS COLOR CALIBRATION.

QMS Printer Adds OS

QMS has beefed up its line of laser printers with the QMS 860 Print System, which has its own operating system and is the first to use the 600-dpi Canon LBP BX print engine. The QMS Crown multitasking operating system runs on a 25MHz i960 RISC processor resident on the printer's system board, keeping track of whether files are PostScript Level 1 or Level 2, HPGL, or PCL (the latter two for the DOS side); controlling the spooling of files on the printer itself; and polling the different interfaces and accepting multiple incoming files simultaneously.

When alternating between PostScript and PCL files, the operating system also stores and switches between the appropriate downloaded font sets to avoid downloading the same font sets from the computer continually.

The printer's simultaneously active interfaces include a serial port, a parallel port, and an AppleTalk connector and can also include one of several optional Ethernet connectors.

The QMS 860 Print System comes standard with 8MB of RAM and can hold up to 32MB.

LUIS DELGADO

THE QMS 860 PRINT SYSTEM USES THE CROWN MULTITASKING OPERATING SYSTEM TO CONTROL PRINT JOBS.

The minimum RAM configuration can produce the printer's maximum resolution of 600 dpi by 600 dpi on letter-size paper, or 300 dpi by 300 dpi on 11-by-17-inch paper. The QMS 860 Print System lists for $4495. QMS expected to begin shipping it in September. QMS, 205/633-4300.—T.M.

Microtek's Color Scanners

Microtek has brought out the ScanMaker II and ScanMaker IIXE, 24-bit color scanners with high performance and resolution of 600 by 300 pixels, or 600 by 600 pixels using software interpolation. The two ScanMakers can also scan line art, halftones, and 256 shades of gray.

The ScanMaker II comes with Adobe Photoshop LE (Limited Edition), which does not include color-separation capability, for a street price estimated at $899. The ScanMaker IIXE comes with the complete version of Adobe Photoshop and with Savitar's ScanMatch color-calibration system. The ScanMaker IIXE lists for $1699. Both were expected to ship in September. Microtek, 213/321-2121.—T.M.

Mass Micro's MO Drive

The DataPak MO/650 from Mass Microsystems is a magneto-optical erasable drive that stores up to 650MB of data. The external drive uses a Sony mechanism and has an average access time of 70ms and a sustained data-transfer rate of up to 680K per second, according to the company.

The DataPak MO/650 is currently shipping at a suggested retail price of $4299. Cartridges for the drive carry a suggested retail price of $199. Mass Microsystems, 408/522-1200.—T.M.

TURKEY SHOOT

DESIGN FLAWS NOTED

Color separators beware: Does your service bureau throw fits when trying to separate files that contain Photoshop duotones? Don't blame it on Adobe. Photoshop uses Pantone's new and improved color-numbering scheme, which adds an extra letter to the end of color numbers, but most other programs (including PageMaker and even Adobe's own Illustrator) still use Pantone's old-fashioned method. To separate files with mixed numbering schemes, you have to delete the final *C*, *U*, or *P* from color numbers.

Logitech MouseMan disables the Restart keyboard command on the Classic, LC, and IIsi. Logitech blames the problem on how Apple assigns ID numbers to ADB devices, but the restart sequence (control-⌘–power-on button) works fine with some other third-party mice and trackballs attached to the keyboard.

Macworld will send you a Turkey Shoot T-shirt if we shoot your turkey in this column. See *How to Contact Macworld*.

Macintosh Gives You The Power To Be Your Best.

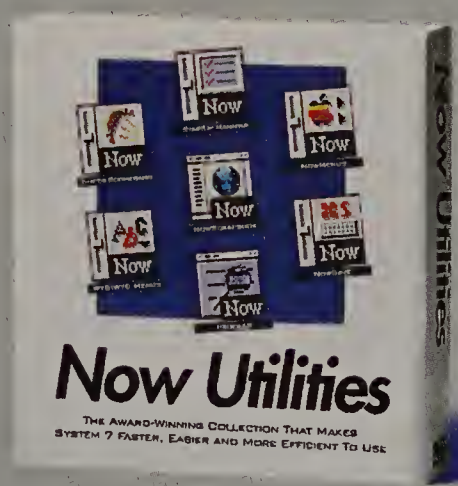
Just As Soon As You Dig Through 300 Folders, Restart Ten Times, And Figure Out What Palatino Looks Like.

You know all those things you wish your Mac did? Like let you get at files and applications immediately instead of digging through umpteen different folders. Or load new extensions without making your entire system blow up. Well, contrary to popular belief, it can. With Now Utilities 4.0, an updated version of the software collection awarded best utility last year by the editors of both MacWeek and MacUser. Its seven components are designed, tested and guaranteed to work together. And it simplifies using your Mac in so many ways, it'd be downright impossible to mention them all in one ad. So here's the Reader's Digest Condensed Version.

|NowMenus| is the ultimate file and application launching tool. It creates submenus up to five levels deep for anything in your Apple Menu. It lets you launch files

and applications instantly. It lets you assign hot keys to menu items on the fly. It lets you group applications, files and folders into worksets. It even lets you change the font and order of its menu items. Is there anything it doesn't let you do? Yes, but give us a break. The ad just started.

| Super Boomerang | saves you time and hassles by keeping track of your most frequently used files and folders. Then it presents them to you in the 'open' and 'save' dialogs of every application. And it finds your lost files with just a partial name or a shred of content to go on — even if they've been compressed.



| NowSave | automatically saves your work after a specified number of minutes, keystrokes or mouse clicks. And if you want, it will record every keystroke in a special back-up file, just as you typed it. So even if your system crashes, your work is saved. As is the hair you would have torn out.

| WYSIWYG Menus | means what you see is what you get. Will it let you see font names in their actual typefaces? Yes. Will it let you change the order, size and color of fonts in their menus? Of course. Will it let you group certain fonts with certain applications and assign them hot keys? Absolutely. Will it group font families together so you don't have to scroll all over kingdom come to find them? You betcha.

| StartUp Manager | controls the loading of extensions and control panels. It helps prevent crashes. It disables extensions that do crash. It even links together extensions that require each other and keeps disagreeable extensions apart so they won't bloody each others' proverbial noses.

| Now Scrapbook | grew out of the 5-mouse-rated Picturebook+. It helps you organize graphics, text, sounds and Quicktime movies and stores them in multiple catalogs that can all be open simultaneously. It also shows you 'thumbnail' views and lets you sort, zoom, scale, resize and crop images just like a real, live art director. Even if you don't have a ponytail.

| Now Profile | is not glamorous. It's not exciting. But it does provide a detailed analysis of your system, its configuration, the whole ball of wax. That way, if you ever run into trouble, all the info is right there. Sexy, no. Smart, yes.

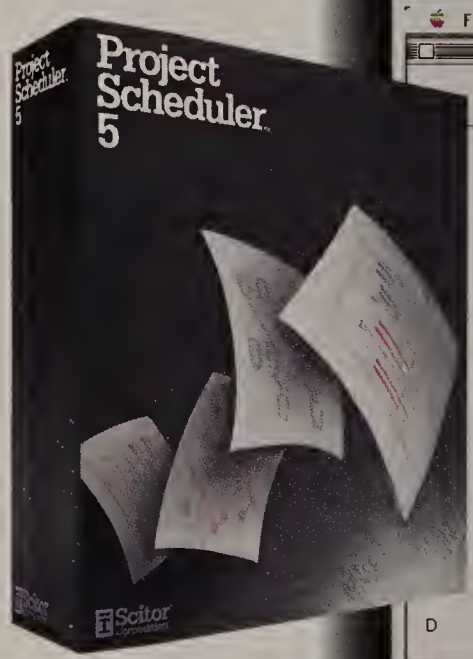
So there it is. Now Utilities 4.0. Or at least as much of it as we can fit in one ad. To get the rest of the details, call us at 1-800-237-3611. Or talk to a dealer. Oh, and just in case you're still wondering, Palatino looks like THIS.

©Now Software, Inc. 319 SW Washington, 11th Floor, Portland, OR 97204. Fax: 503-274-0670. Phone: 503-274-2800. For upgrades call 800-374-4750 or fax 716-873-0906.

Circle 49 on reader service card

Project Scheduler™ 5

Award-winning Project Scheduler 4 just got better.



Introducing the next generation in the award-winning Project Scheduler series—Project Scheduler 5 for the Macintosh.

Awarded "Editor's Choice" by MACWORLD in April 1992, Project Scheduler 4 has gained greater functionality and enhanced performance in Project Scheduler 5. With Project Scheduler 5, you can meet the challenges of coordinating multiple projects. Now, managing tight schedules, limited resources, and different computing platforms is easier than you ever thought possible.

Effective communication.
As a project manager, you know that communication is your most important—and most difficult—task. With Project Scheduler 5, you can convey your scheduling information effectively through customized reports and schedules. And, since Project Scheduler 5 is available in Macintosh, DOS, and OS/2 versions, you can track projects and update schedules easily, even in a multi-platform environment.

Multi-project management with ease.
With Project Scheduler 5 you can track resources and status across multiple projects. Integrate multiple projects into groups and establish dependencies that cross project boundaries. Automatically calculate validated group schedules using error-free, cross-project critical path analysis. And automatically update individual projects to accommodate schedule commitments and changes made at the group level.

A professional product. Backed by professional support.
When you have a question, we'll get you the answer fast—without making you waste your time waiting in an electronic queue. Our support program even provides direct access to Project Scheduler 5's designers. And we offer the most comprehensive training and consulting program in the industry.

The ideal corporate solution.
Whether you're managing multiple projects in a Fortune 500 corporation, or a single project in a small business, Project Scheduler 5 is the fast, easy, and elegant way to make everything come together—on time, every time.

For more information, call or write:

415/570-7700

393 Vintage Park Drive
Suite 140
Foster City, CA 94404

UP TO THREE USERS CAN ACCESS APPLETALK REMOTELY USING THE GATORLINK COMMUNICATIONS SERVER.

Cayman's AppleTalk Remote Server

Cayman Systems' GatorLink is a communications server for Apple's AppleTalk Remote Access that supports up to three users simultaneously over dial-up phone lines. The GatorLink device can hook into an AppleTalk or Ethernet network. It provides lists of network zones that the remote users can access over the phone lines.

The GatorLink also offers passwords and other security features. It was expected to begin shipping in October at a list price of $1895. Cayman Systems, 617/494-1999.—T.M.

Focus's Line of Ethernet Boards

FOCUS has brought out a family of Ethernet products that work with every currently shipping model of the Mac. Most of the products are boards designed for the various models with NuBus or PDS slots, but Focus is also offering external Ethernet boxes that connect to other Macs via the SCSI port. The company is offering a range of choices including thick, thin, and 10BaseT Ethernet connections for most Macs; FPUs for some models; and a $249.99 hub with eight 10BaseT connectors and one thin-net connector.

The Ethernet boards range in price from $139.99 to $229.99, and the external SCSI boxes are priced at $249.99 and $259.99, depending on the type of Ethernet adapter chosen. All the products are currently shipping, according to Focus. Focus, 617/938-8088.—T.M.

BUG REPORT

Now Menus and Retrospect A backup machine running Retrospect with Now Menus 3.02 installed crashes when attempting to back up a Mac that is turned off. Now Software and Retrospect publisher Dantz each claim the other company's software causes the problem.

DocuComp II 1.0 Using the Save As command causes a crash. Bug is fixed in currently shipping 1.03, which is available at no charge to registered users upon request.

Texas Instruments Printers Some models of TI's microLaser printers have a paper-feed problem that can produce a line running all the way across the page at about 1.5 inches from the bottom. For owners of the defective printers, Texas Instruments will "do everything we can to make the customer happy."

MACWORLD WILL SEND YOU A BUG REPORT T-SHIRT IF YOU ARE THE FIRST PERSON TO INFORM US OF A SERIOUS, REPRODUCIBLE BUG THAT WE REPORT IN THIS COLUMN. SEE *HOW TO CONTACT MACWORLD*.

THE DESIGNJET 600 IS A LOW-COST 600-DPI INK-JET PLOTTER FROM HEWLETT-PACKARD.

HP Unveils 600-dpi Plotter

The DesignJet 600 from Hewlett-Packard is a relatively inexpensive ink-jet plotter that produces output at up to 600 by 600 dpi. The plotter comes in two models; one can handle paper up to 36 inches wide, and another handles paper up to 24 inches wide. Both include 4MB of RAM and an Intel 80960 RISC processor for higher performance.

With an optional HP JetDirect interface board the plotters can work with a variety of networks (one at a time), including Ethernet and tokenring. The DesignJet 600 plotters come with Macintosh drivers for AutoCAD, VersaCAD, ClarisCAD, and Architrion. They are also compatible with Microspot's MacPlot, Engineered Software's MacPlots II, and Palomar Software's Plottergeist.

The DesignJet 600 has a suggested list price of $9995 for the model that produces 36-inch-wide output, and a suggested list price of $8495 for the model that produces 24-inch-wide output. Both models of the DesignJet 600 began shipping in August. Hewlett-Packard, 800/752-0900.—T.M.

News

Simulating Life

SAVING THE PLANET is serious stuff, but Maxis thinks we might as well have fun learning how. In its new game SimLife, the Genetic Playground, players create plants and animals and turn them loose in an environment where only the best-adapted species survive. Players introduce mutagens, change the genetics of a single creature and see how its offspring affect the survival of the species, or alter the ecosystem more generally; and players can assume the role of a planetary game warden, a behavioral ecologist, an evolutionary biologist, Charles Darwin, an artificial-life experimenter, or a supreme creator of worlds. SimLife is $69.95 from Maxis, 510/254-9700.

—ANN GARRISON

LOURDES LIVINGSTON

TREND

Coffee-Table CD

RICK SMOLAN

YOU CAN LEAD A CAMEL TO WATER: ROBYN DAVIDSON ARRIVES AT THE OCEAN FROM THE AUSTRALIAN INTERIOR.

A new first in the world of electronic publishing hits the stands in November: a photo book bundled with its own interactive CDs. *From Alice to Ocean* is the story of Robyn Davidson's 1700-mile trek across the Australian outback with four camels and a dog, narrated by Davidson and illustrated with 142 color photographs by Rick Smolan. Smolan produced the CD with Kodak's new Photo CD technology, which makes it possible to drop off film at Kodak shops and get back a CD loaded with photos in digital format. You'll be able to play From Alice to Ocean on a TV (with a new Photo CD–compatible CD player) or on a Mac (with a Mac-compatible CD ROM player). The book will include a Mac-format CD and a Photo CD–format CD for $49.95.—ANN GARRISON

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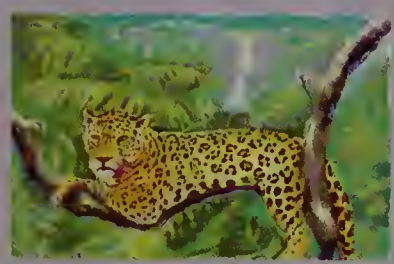
The new PSI PowerModem™ III is the fastest fax and the only 14,400 bps fax and data modem you can buy for your Macintosh® PowerBook™. For more information, call us at 800.622.1722 or 408.559.8544. **PSI POWERMODEMS. WE GIVE YOU THE WORLD™.**

PSI

Circle 61 on reader service card

TREND

On the Waterfront



AXA'S NEW LOW-COST SOFTWARE HAS TOOLS FOR CREATING ART THAT LOOKS LIKE WATERCOLOR PAINTINGS.

A new category of artists' software is emerging that tries to combine the strengths of digital art with those of natural media. Fractal Design Painter was the first such program on the Mac, providing tools that simulate canvas, papers, chalk, and other art supplies.

Now AXA is developing WaterColor, a natural-media paint program like Painter but focused on simulating watercolor tools. WaterColor lets you set the shape, size, and texture of the brush; how wet the brush is and how quickly it dries out; and so on. All color mixing is based on real-world red, yellow, and blue instead of the computer's red, green, and blue. WaterColor does not support pressure-sensitivity in tablets, and the first release has only one paper type. WaterColor is $79. AXA, 714/757-1500.—D.L.

Multiple Resolutions in Color

E-Machines has introduced the T19 II, a 19-inch color monitor that supports two different resolutions. One resolution, 1024 by 768 pixels at 72 pixels per inch, is intended for WYSIWYG desktop publishing. The other resolution, 1152 by 870 pixels at 82 pixels per inch, can show two full pages side by side without horizontal scrolling, or it can display a single large image.

The T19 II lists for $2999 and is currently shipping. When used with the company's 8-bit DoubleColor LX or 24-bit Futura LX display adapters, the E-Machines monitor can switch between the two resolutions without the need to reboot the Macintosh. E-Machines recently introduced the Futura LX at a list price of $1299. It was slated to begin shipping on August 30. E-Machines, 503/646-6699.—T.M.

JOHN WILLIAM LUND

E-MACHINES' T19 II, A 19-INCH COLOR MONITOR, OFFERS RESOLUTIONS UP TO 1152 BY 870 PIXELS.

In Search of Meaning

Have you ever needed to search old files for something but couldn't remember a precise search term? Blueridge Technologies, which makes Optix systems for scanning, archiving, and retrieving documents, has a new technology for just those situations.

Optix NLS, which stands for natural language search, analyzes the syntax and semantic context of documents, using a dictionary of word relationships and meaning relationships (the NLS dictionary can be modified by nonprogrammers). So, for example, if you search for *West*, it might find documents containing *cowboy* or *Wyoming* even if they don't mention *West*.

Optix systems are available as single-user or AppleShare (Macintosh-only) systems, and as Unix-based client-server systems. The Mac NLS module is $1995. Blueridge Technologies, 703/675-3015.—D.L.

Global Warming

NEW YORK'S American Museum of Natural History has mounted what may be the most complex interactive science exhibition to date—Global Warming: Understanding the Forecast. At one of the Mac-based exhibits, visitors direct a global environmental task force and get feedback on the results of their decisions. At another, they learn the basic concepts and mathematics of climate models through a display projected on a 3-by-4-foot monitor. The exhibition was designed at the museum, which now has a department devoted to interactive productions. After January, the show will travel for four years, visiting Los Angeles, Pittsburgh, Denver, Saint Louis, and Washington, D.C. American Museum of Natural History, 212/769-5100.

—ANN GARRISON

News

The Life of the Mind

THE BRAINSTORMING TOOL MindLink is marketed largely by the management-consulting firm Synectics, but not all MindLink users are corporate executives. For example, Tom Duke is a Burlington, Iowa, farmer with 300 acres of corn, 135 acres of soybeans, and some sheep.

Duke spends his spare time hacking makeshift neural nets out of Excel and modifying Apple keyboards. When he's working on his farm, he faces tasks like spraying down the inside of grain storage bins with malathion. Using MindLink, Duke imagined spraying malathion while flying around at the top of the tanks, and from that idea devised a way to reduce his exposure to the poisonous chemical.

MindLink's current version, 2.2, lists for $299. MindLink, 802/457-2025.—D.L.

JEFFERY DAVIS

RENAISSANCE MAN: WHEN TOM DUKE'S NOT FARMING, TEACHING, OR PROGRAMMING, HE'S BRAINSTORMING WITH MINDLINK.

3-D Sound

Thanks to image-editing software like Photoshop, anyone can play tricks on your eyes. Now technology designed for virtual reality applications is making it just as easy to play with your ears.

Focal Point can place sounds anywhere in space. For example, it could attach a sound to an object that moves through an animation, and the sound would seem to follow the object across the screen. Or, using Focal Point's MIDI support, musical instruments in a live concert could seem to fly through the concert hall.

Focal Point comes with end-user and developer software and is bundled with a modified Audiomedia digital signal processor from Digidesign. The package is $1795. Focal Point 3-D Audio, 416/963-9188.—D.L.

BETA WAIT

Long-awaited products

ACIUS's 4D Server
Shown publicly January 1991. Current ship date projected: after just-announced 4D 3.0 ships.

Interleaf 5
Discussed publicly October 1990. No ship date projected.

Claris's FileMaker Pro 2.0
Announced June 1992. Projected ship date: fourth quarter 1992.

Claris's MacWrite Pro
Announced spring 1991. Current ship date projected: end of 1992.

BUY OUR NEW GRAYSCALE SCANNER, AND GET A COLOR SCANNER FREE*

* Well, more or less.

Introducing the ScanMaker II. Microtek's next generation color scanner that's priced like a grayscale scanner. For about the same price as the Hewlett-Packard ScanJet IIp, one of today's most popular grayscale models, the ScanMaker II brings a new level of affordability to color scanning. Thanks to an all new electronic design, the ScanMaker II offers greatly enhanced features, higher reliability, and unbelievable ease of use. And it's faster than any scanner we've ever built.

For more information or the name of your nearest authorized Microtek dealer, call 1-800-654-4160.

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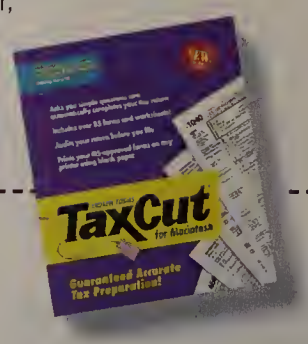
System Requirements

Mac Plus or Higher, System 6.0.2, Hard Disk Drive, 2 MB RAM recommended.



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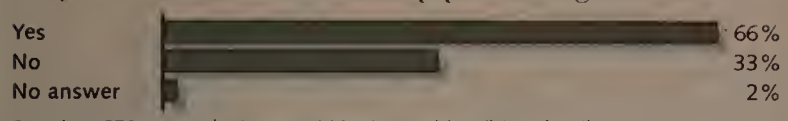
News

Survey: Desktop Publishing

Do you use Macintosh desktop publishing software?



Based on 579 respondents to a 1992 *Macworld* mail-in subscriber *News* survey. Answers do not add up to 100% due to rounding.

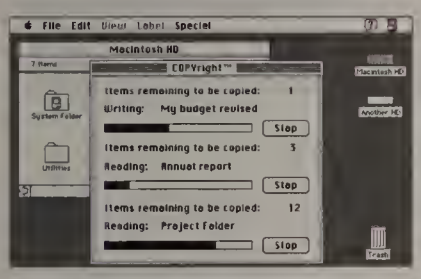
If so, what types of documents do you create?

Based on 381 respondents who use DTP software. Multiple responses were allowed.

Farallon's Minihub

FARALLON RECENTLY introduced the Ether10-T Starlet, an inexpensive twisted-pair Ethernet hub with nine ports. One of the ports is for a thin Ethernet connector for connecting to an Ethernet backbone, while the other eight are for twisted-pair (10BaseT) connectors for attaching to Macs and peripherals.

The Ether10-T Starlet can be used either to create small networks or to expand the port capacity of larger networks. It began shipping in August, at a suggested retail price of $399. Farallon, 510/596-9100.—T.M.



COPYRIGHT IN THE PROCESS OF COPYING THREE FILES TO THREE DIFFERENT PLACES—ALL AT THE SAME TIME.

Copy-Hopping

The Mac's Finder copies one thing at a time, but a new utility called Copyright can perform several copying operations at once. For example, you can start copying files from an AppleShare volume to your local hard drive and, while that is taking place, begin copying other files from your drive to a floppy disk. Copying can continue in the background, giving you access to the Finder.

Copyright also has a scheduling feature; lets you define criteria such as modification date for files to be copied; and logs every copy made to or from your Mac. Copyright is $49 from CSG Technologies, 412/471-7170.—D.L.

Sony's Fast CD ROM Drive

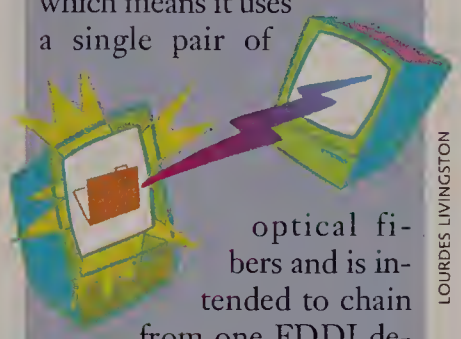
Sony Corporation of America, the leading maker of CD ROM mechanisms for resale by third-party vendors, has introduced a high-speed CD ROM drive mechanism that has an average access time under 300ms and can transfer data at a sustained rate of 300KB per second. Called the CDU-561, the mechanism will appear in third-party products, probably in late November. Significantly faster than most existing CD ROM drives, the CDU-561 achieves its speed by spinning the disc at twice the speed of previous Sony CD ROM drives.

Suggested list prices for drives built around the new mechanism will be set by individual third-party resellers.—T.M.

TREND

FDDI for the Mac

Codenoll Technology has brought out two fiber-optic (FDDI) network boards that work in NuBus Macs and transfer graphics or other data at extremely high speeds. The Codenet 9550 is a single-attached device, which means it uses a single pair of optical fibers and is intended to chain from one FDDI device to another. The Codenet 9553 is a dual-attached device, which means that it can also be used as part of a network backbone with built-in redundancy. The two boards can transfer data at up to 100 Mbps.



LOURDES LIVINGSTON

The Codenet 9550 lists for $3995; the Codenet 9553 for $4995. Codenoll began shipping the 9550 and 9553 boards in August. Codenoll, 914/965-6300.—T.M.

Talking Networks

Ungermann-Bass, supplier of networking hardware for computers large and small, has been adding to its line of products for organization-wide networks with products for workgroup-scale networks. One of its new products is the Access/Hub, a 10BaseT Ethernet hub with 12 ports that Mac, DOS, and Unix machines can share.

The Access/Hub comes in two configurations, one for $1995 with Simple Network Management Protocol capability (the company's NetDirector SNMP-management software does not run on the Mac) and a $1395 unmanaged version. Access/Hubs can be daisy-chained to create bigger networks or can feed into an Access/One, Ungermann-Bass's central switching station, which can connect Ethernets with token ring, FDDI, TCP/IP, and other network types. Access/One's price depends on configuration. Ungermann-Bass, 408/496-0111.—D.L.

C. Itoh Printer for the Mac

THE CI-8 LASER PRINTER from C. Itoh now works with the Mac using an $850 upgrade from C-Tech Electronics. The upgrade, called the Mac-PAT kit, includes PostScript, an AppleTalk interface, and 1MB of RAM.

The C. Itoh printer produces 8 ppm at 300 dpi with edge-enhancement technology to reduce jaggies. The printer contains a RISC processor for faster page preparation. It has a straight paper path for envelopes and labels. The list price of the printer alone is $2395, including 14 bitmap fonts and 8 scalable fonts. It works with DOS machines and comes with a standard parallel interface and two serial ports. Both the printer and the upgrade kit are available now. C-Tech, 714/833-1165.—T.M.

SCOTT PETERSON

THE CI-8 LASER PRINTER FROM C. ITOH CAN WORK WITH THE MAC USING AN UPGRADE FROM C-TECH.

JUST FOR FUN

Auto Mouse

Ever dream of taking a hot Corvette around tight corners at high speeds? Well, with Auto Mouse from Sun Time, you can negotiate some of those turns while tooling around your mouse pad. Auto Mouse is a show-quality model of a red Corvette that fits over a mouse. The hood of the car becomes the mouse button, and users can adjust the amount of pressure required to click. The model is hand-painted, and other colors are available. Available now, Auto Mouse lists for $19.95. Happy dragging! Sun Time, 813/886-1145.—T.M.

SCOTT PETERSON

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Snooper Kit

❼ Snooper provides truly comprehensive system diagnostic capabilities-everything from power supply and system clock, to the serial, modem and ADB ports are covered. Snooper detects hardware problems and sources of intermittent failures. It performs over 60 major component tests, prints the results, and logs errors. It also does benchmark testing and reports on system configurations to allow technicians to find and fix problems quickly. Includes a NuBus card to check errors even when the screen displays a "Sad Mac." **Publisher: MAXA UTI0277**

$159

OPTIMA™ 96 or OPTIMA™ 24*

❼ OPTIMA™ 96 or OPTIMA™ 24 for the Macintosh - Low-cost, high-performance 9600 and 2400 bps modems provide the latest error-control and data compression technology for maximum data throughput. In addition to V.32/9600 bps transmissions, OPTIMA 96 provides 38,400 bps throughput and OPTIMA 24 provides 9600 bps throughput. OPTIMA modems practically operate without you! Automatic Feature Negotiation creates the most efficient combination of speed,error-control, and compression every time. OPTIMA 96 and OPTIMA 24- More modem for your money. **Manufactucer: Hayes *OPTIMA 96* MOD0077 $399.**

***OPTIMA 24* MOD0096**

$149*

Universal SoftPC 2.5 or SoftAT 2.5*

❼ ***Universal SoftPC*** is the best selling PC emulation Software for the Macintosh for those performing word-processing, text based functions and light number crunching calculations. Runs on all Macintosh's and emulates a basic IBM/AT including all the standard PC features. Universal SoftPC is a software solution designed for running off-the-shelf and customized MS-DOS programs on the Macintosh. **COM0107 $195.**

❼ ***SoftAT*** has all the features of the Universal SoftPC and adds EGA graphics, a math coprocessor and expanded memory emulation. SoftAT is ideal for more demanding PC applications including graphics and number crunching. With SoftAT or Universal PC your company's investment in MS-DOS software and training is totally protected.
Publisher: Insignia Solutions COM0108

$299*

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❼ ***VocabuLearn/ce®*** now available in three levels and Compact Disc. Expand your vocabulary base with thousands of new words and phrases! VocabuLearn/ce **$35ea.** Compact Disc **$69ea.** Full line available.

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Publisher: Penton Overseas
Full line available.

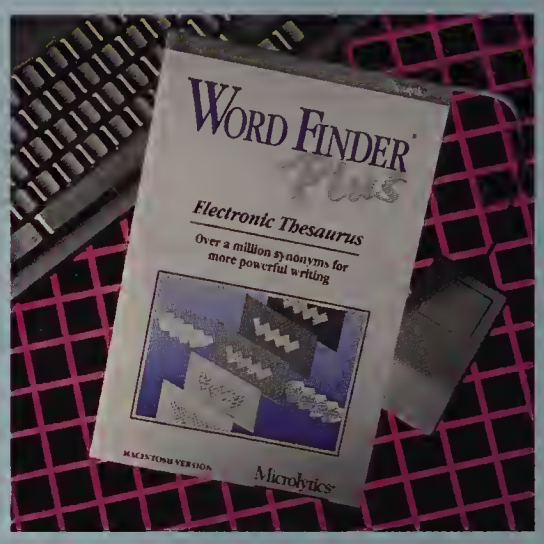
$42ea.*

WristSaver Mini-MousePad

The WristSaver Mousepad's success prompted the WristSaver Mini-Mousepad. At only 5" wide x 8.5" long it is 3" smaller than the original. This is ideal for people who don't have room for a standard size pad. It works well because of the built-in wrist support that raises your wrist about 1" off the desk surface. Your precious desk space is saved and your wrists will thank you. **Manufacturer: LB Innovators**

ACC0757: Navy
ACC0760: Gray
ACC0759: Black
ACC0758: Red

$12ea.



Word Finder Plus

❼ Word Finder Plus helps you find the best words to express your thoughts. Since it's a CDEV, it works with almost any Mac application - not just word processors, but also spreadsheets, database managers, page layout programs, and graphics applications. Designed for the modern business user and writer, Word Finder Plus contains over one million synonyms, yet occupies only 250K of disk space. It's autoinflection feature returns the correct grammatical form of the selected word. Word Finder Plus is handy for creating headlines that fit the space and capture the readers attention. It helps find the right word or phrase for a text label in a drawing.
Publisher: Microlytics SPL0017

$45

Capitalist Pig

❼ New! Animated business simulation game challenges you to build and run your own business under authentic economic conditions. Experience the challenge of business, scandals, fires, terrorists, and more, as you battle for billions—or bankruptcy. Make crucial business decisions every minute, and enjoy the results—or suffer the consequences. Packed with sound, animation, and fun, it draws rave reviews from would-be entrepreneurs of all ages. Capitalist Pig is the must-have "Game of the Year". You never knew business could be so simulating! **Publisher: Pluma Software ENT0447**

$35

NEW

Stickybear's Reading Room

❼ Stickybear's Reading Room makes reading fun for kids from four to eight. This bilingual learning application lets kids switch between English and Spanish at any time. Reading Room uses zany sound effects, stimulating graphics, and verbal reinforcement to entertain and stimulate children as they learn. For example, in the Word Bop game, a special toy cannon "hops" pictures into words, then back into pictures. In the Sentence Builder game, Reading Room reinforces and builds reading ability by animating the sentences kids create. The Word match game asks kids to match pictures with words, and rewards them with sound effects, graphics, and clearly spoken reinforcement. The Word Find game features hundreds of engaging animations. **Publisher: Optimum Resource EDU0355**

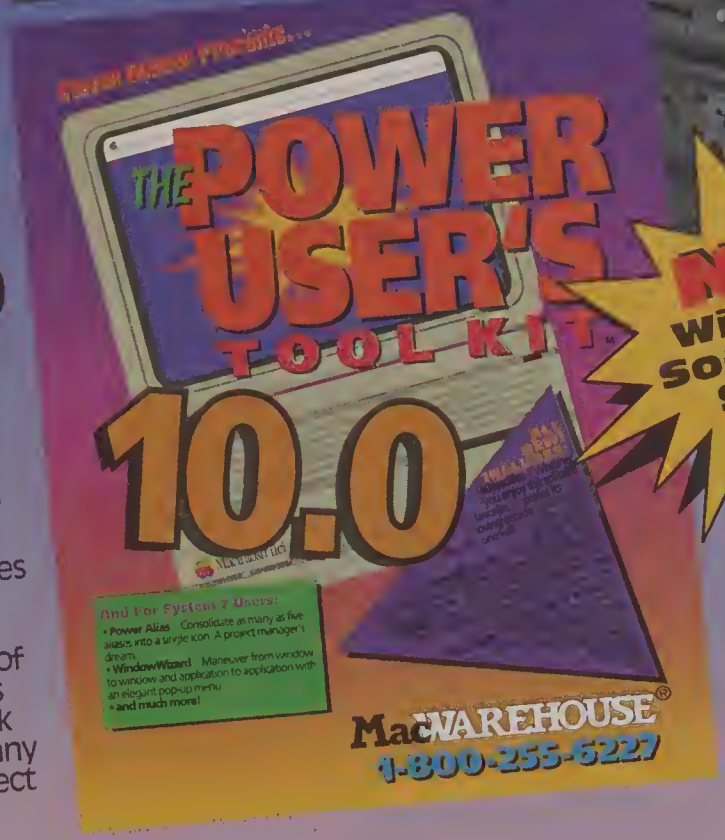
$35

FREE!

POWER USER'S TOOL KIT 10.0

Version 10.0 of Steven Bobker's *Power User's Tool Kit* is stuffed with useful productivity enhancers and software to make your Mac more fun. A valuable collection of twelve programs, *The Power User's Tool Kit 10.0* includes three programs especially designed to take advantage of System 7*.

Here's what awaits you -- *Auto Menus II* makes your Mac's menus drop down automatically whenever you drag the cursor over them. *Ataxx* is a challenging game with elements of Reversi®. *Simsonite* creates empty suitcases for storing and consolidating fonts and desk accessories. *Power Alias* consolidates as many as five aliases into one icon -- great for project management. *WindowWizard* provides a pop-up menu for System 7 users to switch from window to window and application to application. *Klondike* is an enticing version of the solitaire favorite, with an arcade game variation that will knock your socks off.



NEW! With Bonus Software for System 7 Users!

The Power User's Tool Kit 10.0 is *FREE* when you order from MacWAREHOUSE. You pay only $1.50 for shipping and handling. If you would like the disk, please ask for Item #AAA0026.

Some of the programs are shareware, so you can try them free of charge. To continue using them, some authors ask that you pay a small fee ($5-$20). Two of the programs are absolutely FREE! The details are explained on the disk, which is yours to keep, with our compliments.

* All Software works with System 7, three programs are designed to take advantage of its new features.

AutoDoubler

❼ AutoDoubler is the easiest way to increase your hard disk capacity. It works in the background to automatically keep your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work. In fact, AutoDoubler's new patent-pending technique lets your Macintosh use files and applications while they are sull compressed! It's fully compatible with almost all applications, desk accessories, and system extensions. **UTI0254 $49.**

DiskDoubler 3.7

❼ DiskDoubler gives you total control of file compression-archiving for modem transfer, compressed backups, self-expanding files, and fast copying of files. AutoDoubler and DiskDoubler combined give you the ultimate in speed, convenience, and control. System 7 Savvy!
Publisher: Salient UTI0179

$49

Encore 2.5 or MusicTime*

Special Offer, FREE Trax with purchase of either Encore or MusicTime. ❼ ***Encore*** lets you play, compose, edit, and print publisher-quality sheet music. Transcribe MIDI files or play music in from your MIDI keyboard. Includes Passport's "Frets" guitar chord font and Passport's TrueType music font. **MUS0049 $379.**

MusicTime allows you to play, compose, record, and print out music with your Mac. Records music as you play it on a MIDI instrument and displays it in standard musical notation.
Publisher: Passport Designs MUS0105

$169*

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Aldus SuperPaint 3.0
❼ Five time winner of MacWorld magazine's World Class Award, new Aldus SuperPaint combines painting, drawing, and image enhancement, and includes 1 thru 24 bit color, textures, gradients, and EPS graphics. **GRA0112 $133.**
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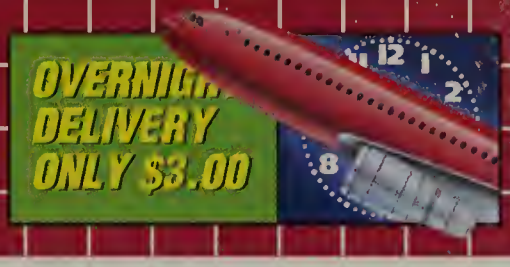

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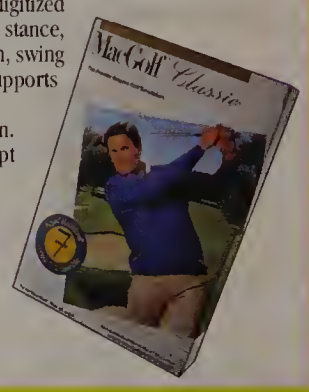

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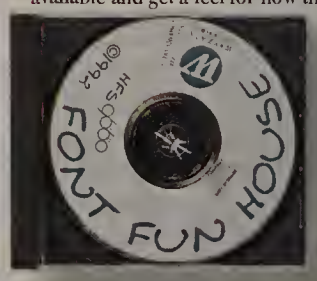
Publisher: Wayzata Technology FON0484



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4 MB	Replace all four 256k SIMMs with four 1 MB SIMMs.
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4 MB	Install two 1 MB SIMMs
To upgrade a 2-socket Mac LC II to this amount of memory	**Do this: (Install in multiples of two only) SIMMs must be 100ns or faster**
6 MB	Install two 1 MB SIMMs.
To upgrade a 8-socket Mac II, IIx, IIci, IIcx or SE/30 to this amount of memory	**Do this: (Install in multiples of four only) SIMMs must be 120ns or faster**
4 MB	Remove all four existing 256k SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256k SIMMs, install four 1 MB in remaining sockets.
8 MB	Remove all four 256k SIMMs, install eight 1MB SIMMs
To upgrade a 4-socket Mac IIsi to this amount of memory	**Do this: (Install in multiples of four only) SIMMs must be 100ns or faster**
5 MB	Install four 1 MB SIMMs.
To upgrade a 4-socket Quadra 700 to this amount of memory	**Do this: (Install in multiples of four only) SIMMs must be 80ns or faster**
8 MB	Install four 1MB SIMMs.
To upgrade a 16-socket Quadra 900 to this amount of memory	**Do this: (Install in multiples of four only) SIMMs must be 80ns or faster**
4 MB	Install four 1MB SIMMs.
8 MB	Install eight 1MB SIMMs.
12 MB	Install twelve 1MB SIMMs.

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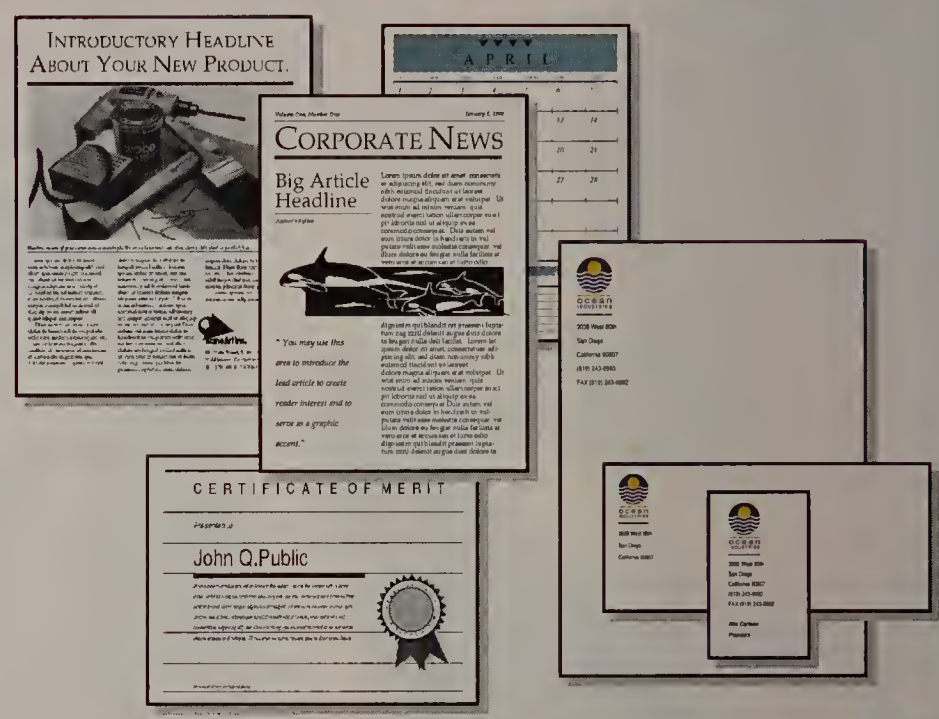

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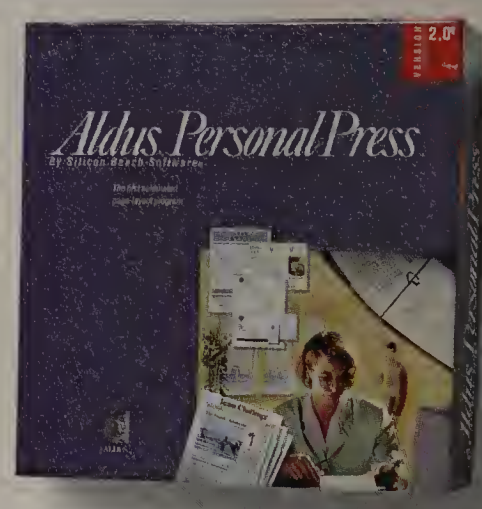

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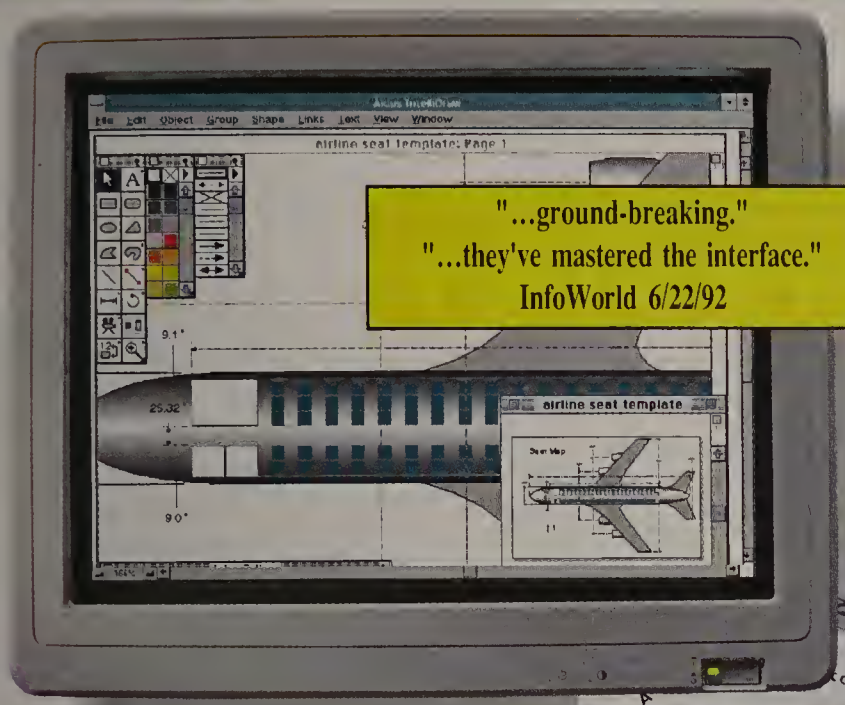

"...ground-breaking."
"...they've mastered the interface."
InfoWorld 6/22/92

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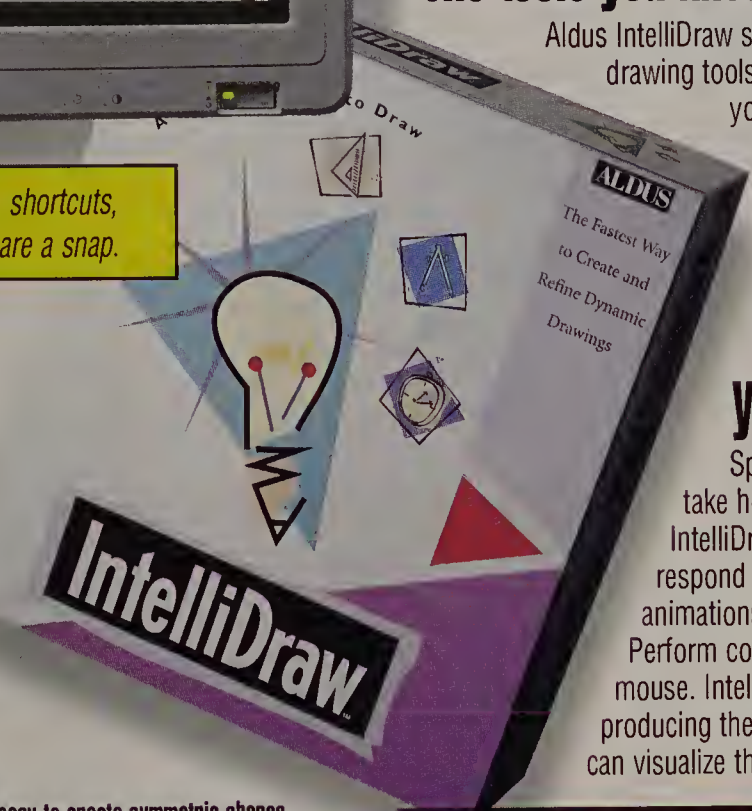

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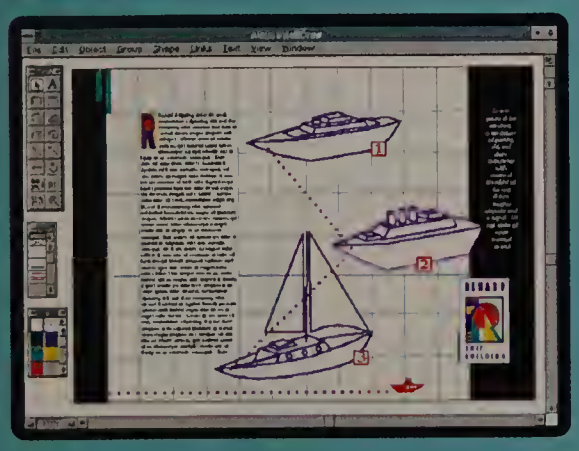

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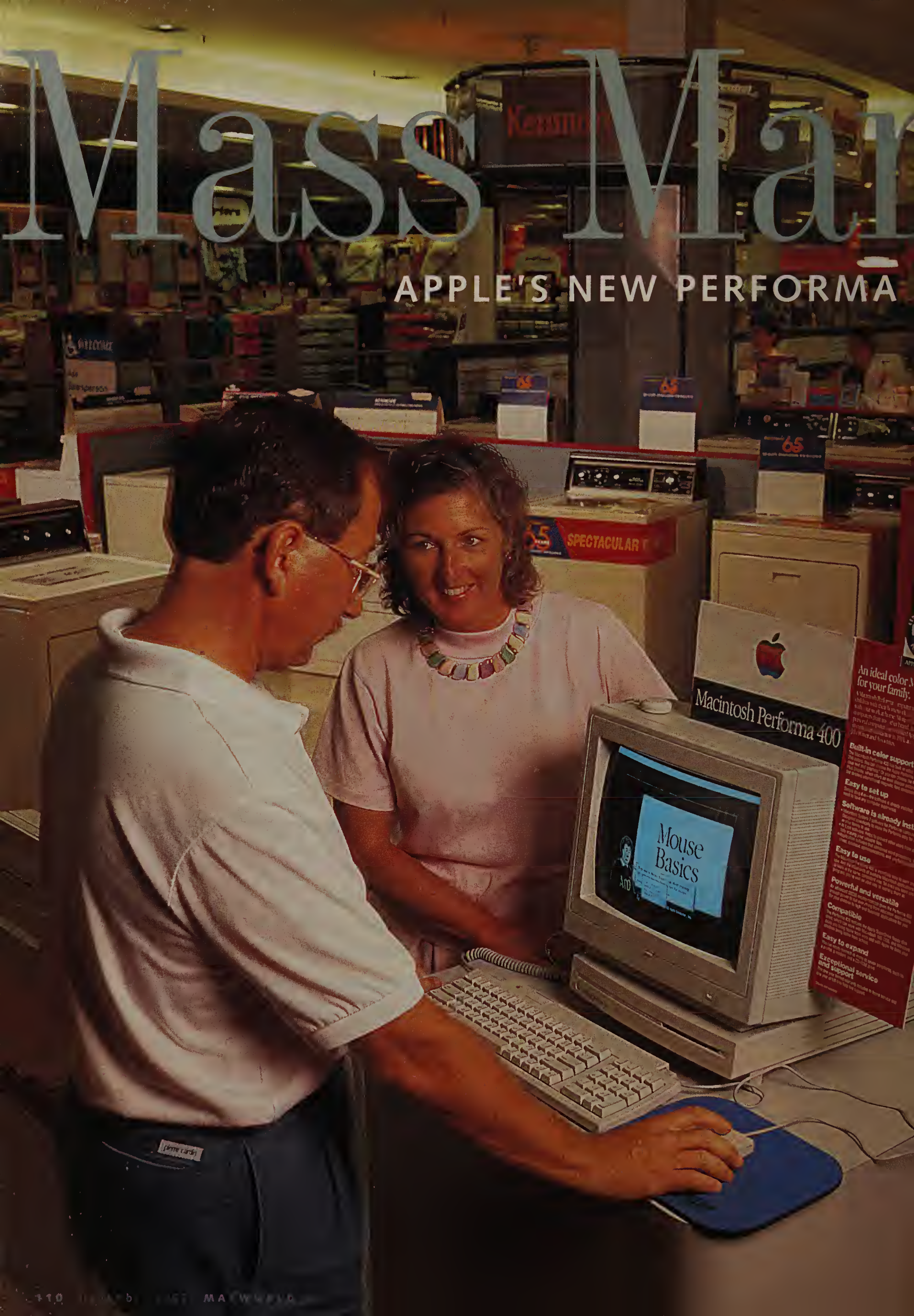
APPLE'S NEW PERFORMA



ket Macs

SERIES IS COMING TO A STORE NEAR YOU

At a Sears store in Paramus, New Jersey, shoppers investigate a Performa 400, located next to the Kenmore washing machine display.

JONATHAN LEVINE

In a bid for the first-time computer buyer, Apple will sell Macintoshes and printers in retail outlets such as Sears and Office Depot. The line of products that Apple will sell is called the Macintosh Performa series, and it consists mainly of proven products—the LC II, Classic II, StyleWriter, and Personal LaserWriter LS. Apple has renamed the LC II the Performa 400 and the Classic II, the Performa 200. The StyleWriter and Personal LaserWriter LS retain their original names. Apple will also continue to sell these products under their original names through the traditional dealer channel. For the consumer market, Apple has made a few minor software changes, added support options, and created lower prices for the Performa series. Most of the changes consist of marketing attempts to bring in the first-time user. The big news, however, is the introduction of a brand-new midrange machine, the Performa 600 (which will be available in October), and two new 14-inch color displays, the Performa Display and the Performa Display Plus (see "The Rest of the Family").

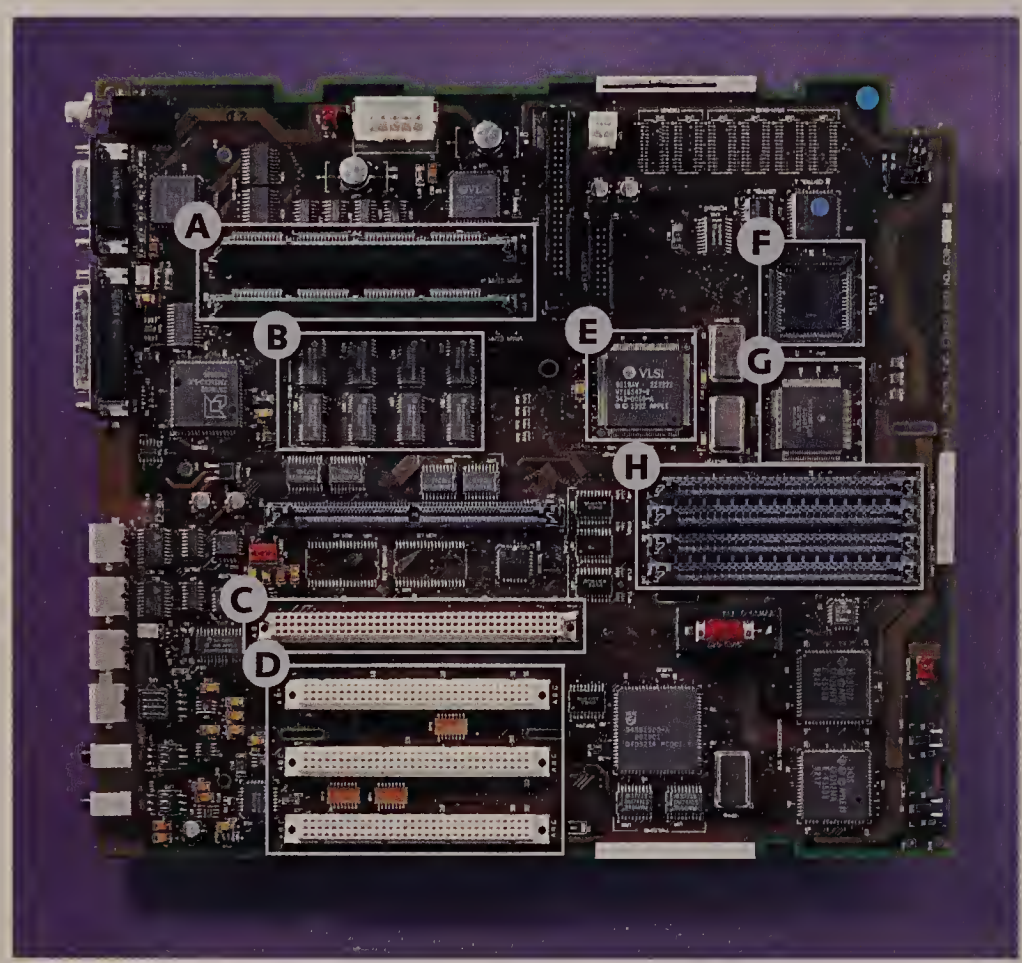
Introducing the Performa 600

ANYONE WHO IS CONSIDERING THE PURCHASE of a Macintosh IIci would do well to look at the Performa 600. Like the Macintosh IIci, the Performa 600 has a 68030 processor, three NuBus slots for adding expansion boards, enough video memory to support 256 colors on a 13-inch monitor, an internal hard drive, a SuperDrive that supports high-density floppy disks, and the standard Macintosh ports for connecting peripherals. One of the big differences between the two machines, however, is that the Performa 600

by Charles Seiter

can be purchased with a speedy internal CD ROM drive, the AppleCD 300i.

Since there's a socket on the Performa logic board for a 68882 math coprocessor but Apple won't be installing one for the home market, you would expect the Performa 600 to be slower at math and math-dependent operations than a Macintosh IIci is. Worse, the lack of an internal cache imposes an additional performance penalty. On the day-to-day operations that matter most—text scrolling, find-and-replace, and plain arithmetic with dollars—the 600 works at 50 to 80 percent of a IIci's speed. Since the IIci costs $3999 for a standard 5/80 configuration, and the 600 is expected to cost about $2500 in a 5/160 configuration with Apple's new CD 300i (about $2000 without the CD and 1MB less of RAM), the 600 is a hardware bargain but not, at these prices, a performance champ.



MARK JOHANN

The Performa 600's logic board displays a high degree of integration. This logic board is from a Performa 600. Some of the more interesting components are (A) 512K of video RAM, (B) 4MB of RAM, (C) accelerator slot, (D) NuBus slots, (E) VASP chip, (F) FPU socket, (G) 32MHz 68030, and (H) DRAM SIMMs.

What you notice first about the Performa 600 is the futuristic case design. The Performa 600 is about the size of the Quadra, but the front panel curves outward, and the Performa 600 is designed for standard horizontal use with a monitor on top. Tap the side of the case with your finger and you'll realize that the monitor will be well supported—the case work is metal. In fact, the Performa 600 can support the weight of a 16-inch monitor—up to 60 pounds.

Metal-forming tooling lasts longer than injection molds for plastic, so the metal box suggests that Apple plans a very long production run for the Performa 600. There's another cost savings in metal as well; Apple no longer has to resort to sprayed-on metallic compounds or separate internal metal screens to battle radio-frequency emissions.

An Internal CD ROM Drive

IN ITS MOST BASIC CONFIGURATION, A PERFORMA 600 has 4MB of RAM, a 160MB internal hard drive, and 512K of video RAM (VRAM). The hard drive fits into a 3½-inch bay in the case. A removable bezel covers the lower-right corner of the Performa 600's front panel, just below the floppy drive. This space accommodates any 5¼ inch device—such as an extra hard drive or other mass storage. Apple is working with vendors who sell storage products to create custom installation rails so that Apple dealers can plug in storage units. But Apple really hopes you'll use the space for the AppleCD 300i CD ROM drive.

The 300i provides a serious price and performance improvement over Apple's external CD ROM drive, the AppleCD 150. The 300i uses a Sony mechanism that is completely enclosed to protect it from dust particles. The 300i transfers data at 300K, twice the speed at which sound is transferred (150K). Apple has rewritten the CD driver—it's now version 4.0—to support both the 300i's higher speed and Kodak's Photo CD system.

If you buy a system that includes the 300i, Apple will upgrade the RAM on the Performa 600 to a total of 5MB and will upgrade the VRAM to a total of 1MB. The extra main memory is needed to give System 7 enough room when it is working with the large files stored on CD ROMs, and the additional video RAM allows you to display CD ROM images in photo-realistic, 16-bit color (Apple's recommended color depth for playing QuickTime video). The RAM/VRAM upgrade and 300i together add about $500 to the price of a basic Performa 600. Apple also plans to provide several CD ROM titles with the 300i, although at press time, these titles were not finalized.

Photo CD Support

THE BEST FEATURE OF THE APPLECD 300i IS ITS full-blown support for Eastman Kodak's Photo CD system. With Photo CD, you take photos with your camera as you always have, but when you take the rolls of film to a photography lab, the lab adds them to a CD ROM. Apple's CD ROM drive will support multiple-session capability—a key feature of Photo CD—which lets you add several different sets of photos to a CD ROM at different times. In addition, a special application provided with the CD ROM driver software converts photos on the disc to PICT files, compresses them into thumbnail images, and then lets you play a slide show of the photos, controlling the presentation with the standard QuickTime slider at the bottom of the viewing window.

Expansion Options

APPLE HAS DONE AN EXCELLENT JOB OF PLANNING for expansion in the Performa 600. Besides the 5¼-inch drive bay, there are several sets of slots for adding upgrade options. And the interior design of the Performa 600 makes it easy for the user to access all the slots as well as other key components. The expansion options include

- **Video RAM** The standard Performa 600 has 512K of VRAM soldered to the logic board. This allows the Performa 600 to support 256 colors on 13-inch Apple monitors and also on a fairly large assortment of low-cost VGA monitors and some SVGA monitors. But the Performa 600 also includes two slots for adding 256K VRAM SIMMs. With a total of 1MB of

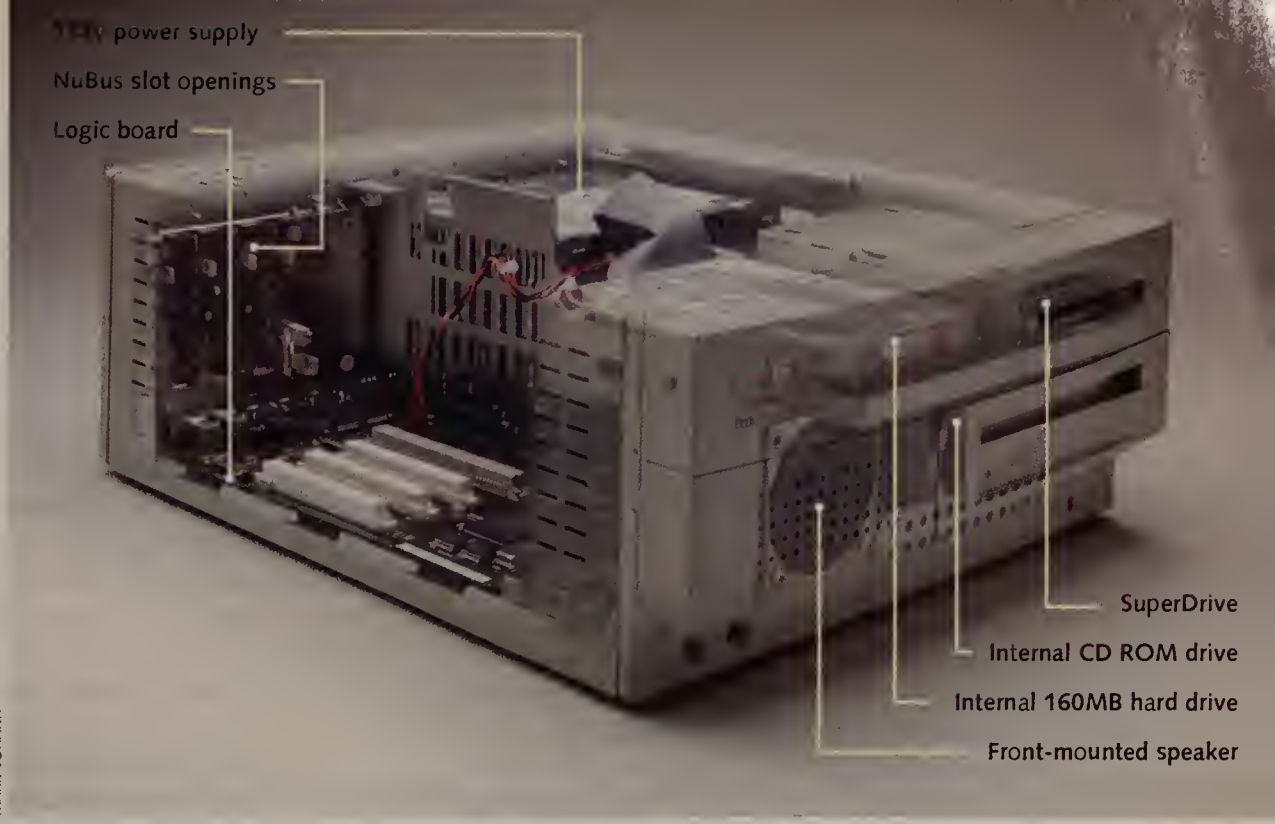
VRAM, the Performa 600 supports 32,000 colors on 13-inch Apple monitors. No matter how much VRAM the Performa 600 has, however, it cannot drive any monitors larger than 14 inches.

▪ **System memory** The basic Performa 600 has 4MB of RAM soldered to the logic board, and there are slots for four SIMMs. Since the slots can take 1MB, 2MB, 4MB, 8MB, or 16MB SIMMs, you can create memory configurations for the Performa 600 that range from the stock 4MB up to 68MB (the stock 4MB plus four 16MB SIMMs), which should even be enough to run Microsoft Word 8.0 under System 9.0.1 in 1998.

▪ **Acceleration** The logic board of the Performa 600 features a slot designed specifically for accelerators, meaning 68040-based accelerators, since the system already has a fast 68030. We weren't given the exact pin assignments, but Apple says that this slot most nearly resembles the Macintosh IIci cache slot. But because the Performa does not support cache-enable and -disable functions, the slot must contain a CPU accelerator, not a cache card. Apple has tested some accelerators already; the PowerCache 040, a IIci accelerator from DayStar, has been qualified as compatible, and Apple expects that most accelerators for the IIci will work as well.

▪ **Floating-point unit** The Performa 600 does not include an FPU for speeding mathematical calculations, but the logic board does include a socket for adding a third-party FPU chip. Many accelerator boards also include an FPU option.

▪ **NuBus slots** The Performa 600 includes three NuBus slots. Since virtually every performance feature imaginable is either on the logic board or available through the accelerator slot, the most popular use of NuBus slots will be for graphics boards for large monitors, 24-bit color graphics boards, graphics accelerators, or Ethernet boards (the Performa 600 does not include built-in Ethernet). In fact, a little planning is appropriate for high-end color users—if you know you will need a full 24-bit system, there's no point in populating the rest of the VRAM on the logic board, since you'll need a NuBus board anyway. Other uses are likely to include data acquisition, video editing, or other vertical-market functions.



MARK JOHANN

Inside the Performa 600 The Performa 600 includes room for a 5¼-inch drive device, filled here by an internal CD ROM drive, as well as a 3½-inch drive bay, filled here by a 160MB internal hard drive.

The Logic Board

THE LEVEL OF INTEGRATION IN THE PERFORMA 600 is high. Looking down on the newly designed logic board, the highlights are the 68030 processor, a socket for a 68882 math chip, the 4MB RAM bank, and a handful (five, actually) of custom chips—including the VASP chip, which takes care of memory management, clocking functions, and color control. The power supply to run this chip set has been beefed up to 112 watts from the Macintosh IIci's 90w. Apple has built lots of power margin into this system; running the CD ROM, an accelerator, 68MB of RAM,

MW LAB

How Fast Is a Performa 600?

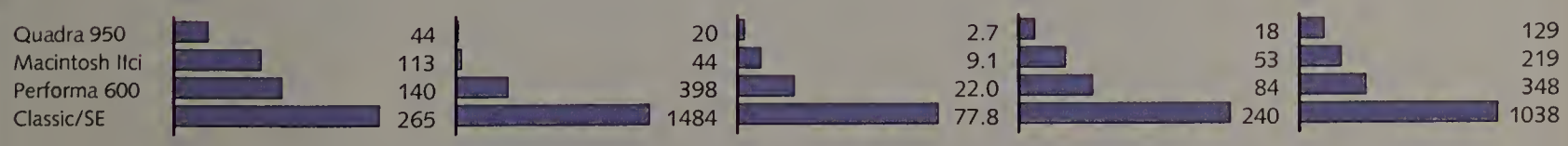
Screen Redraw
Two scroll tests—in Microsoft Excel and Word 5.0—represent overall graphics-handling performance, since scrolling is one of the Mac's most common graphical tasks.

FPU Math
A scientific recalculation in Excel 4.0 shows the floating-point-unit math coprocessor's performance—or its lack of performance.

Non-FPU Math
A business recalculation in Excel 4.0 shows the performance of math functions by the processor and Standard Apple Numerics Environment (SANE).

Processor
Four Tests—a sort in FileMaker Pro, a preview and magnification in Aldus FreeHand, and search-and-replace in Microsoft Word 5.0—measure the speed of the processor by itself.

Drive
Four drive-intensive tests—sorting in 4D, opening a file in Photoshop, compiling in Think C, and duplicating a 3.9MB file—measure the CPU's processing speed as well as its ability to transfer data to and from an external Storage Dimensions 800MB drive.



Times are in seconds. Shorter bars are better.

The Quadra 950, Macintosh IIci, and Classic SE were tested with 8MB of RAM, internal video, and System 7.0.1 with TuneUp. The Macintosh IIci also had a Macintosh IIci Cache Card. The Performa 600 was tested with 8MB of RAM, internal video, and System 7.1b10, a beta version of the new system shipping with the Performa series.

The Rest of the Family

Apple had to admit it. Gone are the days of high profit margins and an ever-expanding Macintosh base. Though there are millions of Macs out there, there are still millions of American households without one. What's a computer company to do?

Think toasters. Think televisions. Think about all those appliance-acquiring families who have never crossed the doorsill of a computer emporium. Apple has a plan.

ATTENTION SHOPPERS

Recognizing that many potential owners of Apple products are intimidated by the technospeak and vast array of hardware configurations and software options available in computer stores and mail-order catalogs, Apple is launching a new product line, the Performa series, aimed precisely at this market. In the initial launch, the one new and two not-so-new machines, and their peripherals, are being offered in more than 1600 consumer retail outlets nationwide. Shoppers at places like Sears, Silo, and Office Depot are already beginning to find Apple products next to the fax machines and audio CD players.

The Performa packages are clearly aimed at individuals who want a simple plug-and-play solution—integrated hardware, a palette of useful software, and dependable vendor support, all at a decent price. But inside the package, the Performa 200 is a Classic II, the Performa 400 is an LC II, and the Performa 600 is based on the same 68030 processor as the Macintosh IIci. So why the new name?

While these machines look familiar, Apple claims that the new Performa owner is buying more than just the hardware. They're buying a modified version of System 7 operating software; a selection of already installed software applications; and a rather new approach to service and support.

Because customers can't expect roving salespersons at consumer outlets to offer the same kind of knowledgeable service that Apple dealers usually provide, Apple itself will offer one year of toll-free technical support and one year of in-home service. (Yes, Apple says that it will make house calls if its tech-support staff determines a visit is necessary.) Those familiar with Apple's reputation for support to date will be forgiven for snickering, but Apple promises that it is intent on providing what is recognized as a bottom-line service by the larger consumer market.

SOFTWARE ADJUSTMENTS

One sign that the Performa series is aimed at a new audience is System 7—some of its more advanced features have been cloaked to make the Finder more approachable and easier to learn, while others, like DAL, have been left out altogether.

For a start, the default desktop patterns appear in color on the 400 and 600 instead of a more staid gray pattern. After booting, a new Launcher utility appears in the bottom-left corner of the screen. It contains large, color application icons that require only one click to open; research with computer neophytes indicates that a double-click is too much for too many. All factory-installed applications are automatically available from the Launcher.

When you choose Save from any application's menu, you are by default presented with a Documents folder, thereby avoiding the embarrassment we all feel when we can't find a file we've just closed. You can, of course, navigate to any other folder should you choose to save the document elsewhere.

To avoid the vertigo that some new users feel when they accidentally click outside a document window and find themselves back in the Finder, the Performa system software hides the Finder layer when applications are being used. Clicking outside a document window doesn't return you to the Finder, and volume icons and the Trash Can are hidden. You can return to the Finder by selecting it from the Application menu located in the upper-right corner of the screen.

In addition, the Performa series includes an Apple backup-and-restore utility that lets users copy the contents of their hard drive to a set of floppy disks.

MARK JOHANN

The Performa 200 (left) and Performa 400 are adapted versions of the Mac Classic II and LC II.

AT EASE

The Performa units also ship with At Ease, a System 7 extension designed to simplify file management for those who share a Macintosh. (Other Mac owners can purchase At Ease separately for $59.)

With At Ease installed, the traditional Finder disappears, and two nearly screen-size folders, one labeled Applications and the other Documents, dominate the desktop. Applications and documents appear on these folders as large colored icons and, just as in the Launcher, a single click of the mouse opens them.

To control access to files, a designated system operator—mom or dad, for instance—easily determines who can open, edit, or rename files. Kids can't tinker with tax returns, coworkers can't add odd and embarrassing sounds to your System, and bosses can't read sensitive and confidential material, such as your résumé. There's no Trash Can, so files can't be inadvertently thrown away; and you can lock the hard drive, forcing other users to save to floppy disks. An optional password reopens the Finder.

GETTING THE WORKS

Filling out the Performa bill is a selection of one to three third-party application products such as word processors, spreadsheets, and databases in integrated packages; graphics programs; and communications packages. The applications come installed on the hard drive, and their oversize icons appear in the Launcher window. Accompanying manuals are included in the box with the hardware.

THE PERFORMA DISPLAY

The Performa 200's black-and-white 9-inch display is built in, but owners of the Performa 400 and 600 can choose between two new monitors, the Apple Performa Display and the Apple Performa Display Plus. These new monitors do not use the Sony Trinitron tube used in the AppleColor High-Resolution RGB Monitor; instead, they use a tube (unidentified by Apple) that is made in Taiwan.

Both Performa displays measure 14 inches diagonally, and their screens are slightly more curved than the Trinitron-based Apple monitor's screen. The 512K of video RAM (VRAM) included on the Performa 400 and 600 machines limits those machines to displaying only 256 hues on the Performa displays; the

Performa 600 offers an option that brings the VRAM up to 1MB and the number of colors to 32,000. Both Performa displays have screens with 640-by-480-pixel resolution.

The Apple Performa Display Plus is the more expensive of the two, retailing for $450, and complies with the Swedish government's extremely-low-frequency (ELF) emissions guidelines. The Performa Display Plus has a dot pitch of 0.29 that makes it just slightly coarser than the more expensive AppleColor display ($999), which has a dot pitch of 0.28. The less expensive Apple Performa Display retails for $350, does not conform to the Swedish guidelines, and has a dot pitch of 0.39, which results in the coarsest screen image of the three.

Macworld Lab testing showed that both Performa displays had better brightness than the AppleColor display, but the AppleColor display had better contrast, especially at normal brightness levels, perhaps due to the extra glare picked up by the Performa displays' curved screens. The AppleColor display also had slightly better convergence (how precisely the red, green, and blue electron guns hit their targets) than the Performa displays, as well as better color purity (the ability of a monitor to display pure white and less distortion). Subjective testing by *Macworld* staff garnered underwhelming enthusiasm for the Performa displays—they seemed muddy, washed-out, and slightly blurry. Those who spend all day at their screens seemed to feel the extra money for the AppleColor display was a worthwhile investment.

Performa packing boxes list the products included in that package, and pictures of the contents appear on the outside. Even keyboards are included this time around. (Extended keyboards are standard with the 600, optional with the 400.) Every effort is clearly being made to make purchase as painless as possible.

DEALER'S CHOICE

So how much does all this entry-level technology cost? And which software packages and keyboards come with each setup? Even Apple wasn't sure at press time. Within some constraints imposed by Apple, each of the outlets included in the launch of the Performa line are free to bundle and price as they see fit. Estimated prices are $1250 for the Performa 200, $1450 for the 400, and $2500 for the Performa 600 sans monitor but with the AppleCD 300i CD ROM player.

These are competitive prices, and the Performa packages just might prove attractive to babied boomers hoping to mitigate the education crisis on the home front with a personal computer. If successful, this strategy will obviously bode well for Apple and the consumer outlets, but many questions arise.

By offering Macintoshes in retail outlets, Apple presents users with somewhat confusing choices. Since the prices for the Classic II and LC II look-alikes are below those of their Macintosh counterparts (at $1849 for each with 4MB of RAM and an 80MB hard drive), why would someone buy a machine from a traditional Macintosh dealer, thereby passing up the installed software and enhanced service packages? Why would dealers bother trying to sell these machines?

There is always a fair share of grumbling within the third-party vendor community. Should the Apple-consumer push be as successful as some pundits predict, won't vendors feel even more subject to Apple's whims and manipulations? Will some be discouraged from continuing to develop for the Macintosh platform?

And what if Apple is wrong and the Performas are still too expensive and too difficult to master? A dwindling market share means even less money for research and development. Can Apple survive without constant upgrading and innovation?

Whether the Performa series opens up the demand for home computers, or merely provides an easy way for the already converted to buy Macintoshes, one thing is certain. Apple marketing will never be the same again.

—SUZANNE STEFANAC

MARK JOHANN

The Apple StyleWriter (left) and the Personal LaserWriter LS will be sold with the Performa series at major retail outlets.

and boards in all three NuBus slots, there are still about 20w to spare, if all the boards are designed within Apple's engineering guidelines.

The input/output panel section of the logic board has two Apple Desktop Bus (ADB) ports and two serial ports (RS-232C/RS-422C). The serial ports can be driven at 29K per second from the logic board, or at four times this speed if they're clocked externally. For instance, some data-acquisition boards that communicate over the serial port can be set to change the clock speed of the serial port so that it can receive data faster than normal. There are also ports for the SCSI bus, video, printer, and modem. There are the standard mono sound input and stereo output.

The Performa 600 also includes a direct sound connection from the 300i CD ROM drive to the logic board. Thus, if a CD ROM contains digital audio, the Performa 600 can play it through its speaker. Additionally, the Performa 600 can record sound from a CD ROM. Without the direct play-through capability, you would have to hook speakers to an external CD ROM drive in order to hear sound.

Should You Buy the Performa 600?

APPLE'S MOST POPULAR PRODUCTS—THE CLASSIC II and the LC II—make up the low and midrange machines in the Performa series. A competitor to the popular midrange Macintosh IIci (which will still be sold through traditional dealer channels), the Performa 600 makes up the high end of the new consumer lineup. Right now the most enticing configuration (5MB of RAM, a 160MB hard drive, and an internal CD) is expected to sell for about $2500, compared with $3999 for the 5/80 Macintosh IIci.

The basic Performa 600 offers a lot more for the money than a Macintosh IIci and provides a no-penalties upgrade path. Whether you use the drive bay to eliminate extra-drive clutter on your desk or to participate in Apple's vision for the future of CD ROM, the bay is a nice bit of industrial design. None of the new hardware is technically earth-shattering (the Photo CD system is dazzling, though), but the Performa 600 represents the sum of many good decisions implemented well. The Performa 600 is going to find many happy owners in the middle of the market through the middle of the 1990s. **m**

CHARLES SEITER has, like most *Macworld* contributing editors, been long awaiting a low-cost Mac with a CD ROM drive. He designs analytical equipment for biotechnology firms in the San Francisco Bay Area.

Macworld Lab testing supervised by MARK HURLOW.

Balancing the Books

BY ALAN L. SLAY

There's a wide range of potential customers for Macintosh accounting programs. Let's take a look at four different kinds of users who typify the broad range of accounting requirements. Peter Workhome wants to start a small business he can run from his home during the day so that he can spend more time with his children. Tom Smallbiz and his wife, Jan, run a small service business. They have four employees, and Jan spends most of the day outside the home, working with customers, while Tom handles the office operation.

Harry Bigbiz has been growing his business steadily for the past five years and now has a nearly $2 million cash flow per year. He automated his accounting procedure with a fairly simple accounting program a few years ago, but his office operation is now close to chaos because of confusion among all the extra people he hired to keep the paper moving. And there's Julie C. Corporate, who is trying to save her company money (and get herself a promotion as well) by moving the firm's finances from a mainframe to a Macintosh network.

OUR ANNUAL OVERVIEW OF 20 ACCOUNTING PROGRAMS

Home Finance

PETER WORKHOME CAN BEGIN BY LOOKING AT personal-finance programs like Survivor Software's MacMoney, Aatrix Software's Checkwriter, Intuit's Quicken, or MECA Software's Managing Your Money.

These programs are aimed primarily at personal-finance users, but they fulfill small-business needs as well by offering business charts of accounts and explaining in their documentation how to perform common business functions. All four include check writing, transaction entries, budgeting, and other basic bookkeeping functions. They also produce all the basic reports needed for any small business, and each is available at a street price well under $100.

I think Peter Workhome should look at the MacMoney program first. Although its bookkeeping terminology is different from that in business packages—you don't have general ledgers or accounts receivable, for example—you still accomplish the same basic accounting tasks. Instead of entering a purchase as an accounts payable, for instance, you enter it as a credit card purchase. And Survivor Software's unlimited free support, plus the newsletter the company publishes periodically for registered users, makes getting up to speed relatively easy.

MacMoney also offers an add-on for accounts receivables, called InvoicIt, that allows you to pre-

PHOTO BY HUGH KRETSCHMER

pare professional-looking invoices and integrates these transactions into the main package as an asset—money owed to you by other people.

Peter should also consider Aatrix's Checkwriter 4/0. On the personal-finance side, Checkwriter 4/0 offers features for planning such things as purchasing a car, financing a college education, and even picking a lottery number (you won't find that in any other accounting program). Checkwriter offers an integrated add-on program for doing a small-business payroll, as well as a stand-alone business-payroll program (which does not share data with Checkwriter) for larger payrolls. I particularly liked being able to fill out a deposit form on screen, print it, and use it at the bank. Aatrix also offers unlimited free telephone support.

Personal-finance programs can fulfill business needs as well by offering business charts of accounts and good documentation

My next recommendation is Quicken. It tracks assets, liabilities, income, and expenses—the same basic elements you'll find in most business accounting applications. The program has a good Mac interface and is easy to learn and use; Intuit provides unlimited free support. Quicken also connects to the Checkfree service (at additional cost), which enables you to transfer money via modem.

If Peter is already using MECA Software's Managing Your Money (MYM) to track his personal assets (such as insurance policies, stocks and bonds, and retirement and tax-planning accounts), he could easily adapt it to also track his business expenditures and incomes, but I wouldn't recommend it as a personal-finance package otherwise. MYM, like Checkwriter 4/0, Quicken, and MacMoney, covers how to use the program for business in its documentation. Like Quicken, MYM also offers the option of paying checks electronically through Checkfree. Peter might also consider using Signature Systems' Simple Accounting Plus (once Plains and Simple Accounting from Great Plains Software). This package is designed to mimic a manual one-write system.

DRAKE SOREY

At Joseph Schmidt Confections' 25,000-square-foot chocolate factory in San Francisco, company controller Matt Ehlen (left, with coworker Leticia Santamaria) uses Great Plains Accounting to keep track of the business.

All the personal-finance programs let you export data to MacInTax at the end of the year, for calculating your taxes (or giving to your accountant to do your taxes).

Still, Peter doesn't think he'll be satisfied with adapting a personal-finance program to his business. He knows enough to feel comfortable with numbers and bookkeeping forms, and he has to manage a small inventory, which can get pretty confusing in a personal-finance program. He should consider an integrated program, which incorporates basic bookkeeping functions into one program. Such programs also organize financial information into traditional accounting categories like accounts receivable and payable, making it easier to turn the books over to an accountant during tax season.

I'd recommend Teleware's M.Y.O.B. The program uses a file cabinet metaphor—you go to various file drawers to write checks, enter bills, add inventory, and produce reports. Work-flow diagrams guide you through all the necessary steps in common business tasks.

M.Y.O.B. offers general ledger, accounts payable and receivable, and inventory; it does not offer payroll. M.Y.O.B. also lets you schedule appointments and create a database of vendors and customers. These functions are a bonus feature for people like Peter, who want to keep name and address information together with financial records.

Although Peter doesn't need a payroll program (he is the only employee), people like Tom and Jan Smallbiz could certainly make use of one. Tom could handle the checks, salaries, and deductions manually. But payroll can get fairly complicated and time-consuming when you're preparing it for three or more employees, since you're not only paying the employees their take-home pay, but also withholding and assuming obligations for federal, state, and local taxes; federal and state unemployment; and other deductions for insurance or medical benefits.

CheckMark Software's Checkmark MultiLedger and its companion program, Payroll, are my recommendations to people who need to do payroll. The documentation is lean, but the programs are easy to navigate. People like Tom and Jan with only a few employees can probably process their payroll in about the same amount of time they'd spend preparing the data for a payroll service. CheckMark's Payroll program is also flexible, allowing for easy entry of different hours for each period, with the option of saving the hours if they don't change (or change little) from payroll to payroll. MultiLedger also offers calculation of sales commissions. As a bonus, Payroll lets users change their tax tables manually. (Most other programs require you to buy updates to keep tax tables current.)

Another excellent program for people like Tom and Jan is Accountant, Inc. from Softsync. The menus are longer than those in MultiLedger (although this is compensated for by Accountant's comprehensive and clearly written documentation), but

they are far from complex. Accountant includes general ledger, accounts receivable, accounts payable, inventory, and payroll. In September, Softsync plans to include Snow International's Report Writer with Accountant, which will be a plus for users who regularly produce lots of reports. Both the CheckMark programs and Accountant come in multiuser versions, so they can handle expansion as your currently part-time bookkeeping responsibilities grow into a job for more than one person.

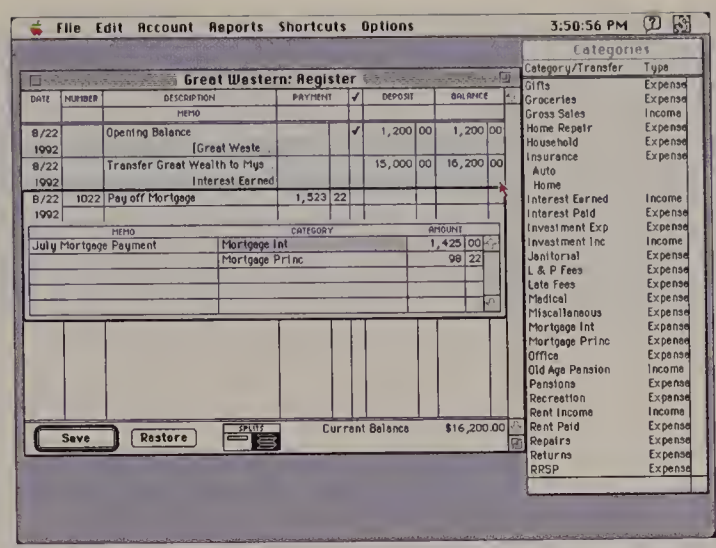
Computer Associates' ACCPAC Simply Accounting could use some updating (it doesn't offer on-screen checkbook reconciliation, which I think is a necessity for easy bookkeeping); but it is still a basic, simple program appropriate for many non-bookkeepers. The main screen consists of icons of the program's ledgers and journals; you move around the books easily by working from and returning to the main screen, with a separate set of menus for each area of the program.

Users that need payroll but not inventory and would like an easy-to-use program should consider Peachtree Software's Peachtree Accounting for Macintosh (formerly atOnce), which offers general ledger, accounts receivable, accounts payable, and payroll. The interface lets you move easily from the summary level to detailed data-entry screens with a few mouse-clicks. And at a $99 list price, it is the best value of all the accounting packages for the budget-conscious bookkeepers out there.

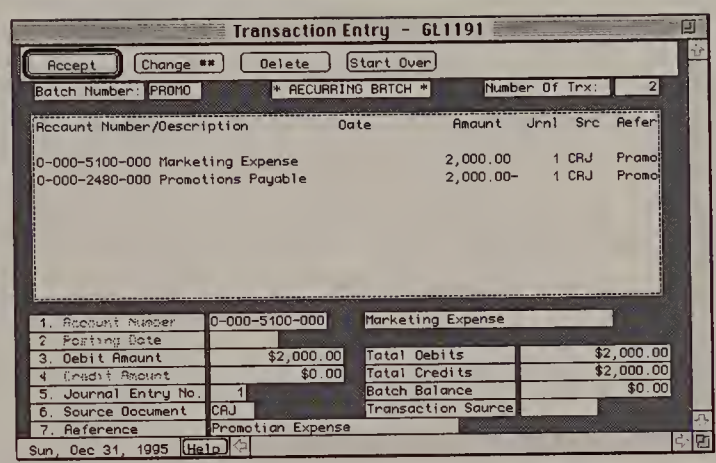
Business Sense Integrated Accounting Software, from Business Sense Inc. ($199), is an alternative to Peachtree Accounting for Macintosh and offers general ledger, accounts receivable, accounts payable, and payroll. The program is organized around a main screen in which icons represent functions and journals. To enter the payables journal, for example, you click on the purchases icon; the entry screens are electronic replicas of the standard double-entry ledger pages familiar to people used to doing accounting manually.

The payroll tax tables included with the program, however, require real effort to use. Instead of a single annualized table, there are separate entries for each of the different pay periods (either 12 or 13), each of the three categories (single, married, head of household), and each salary bracket. You can create and update these files yourself, or you can buy the federal tables from the program's publisher. Of the state tables, only California's is available for purchase, so you can plan on several hours of entering and updating tax data for any other state.

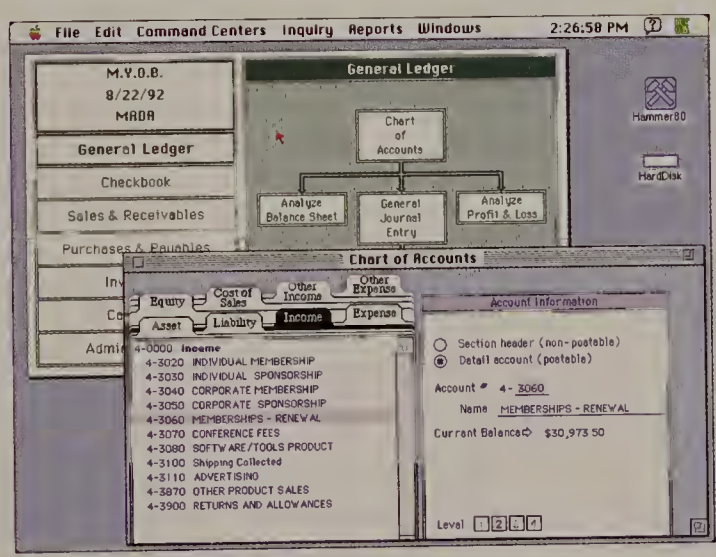
HyperCard enthusiasts might consider Wetzel & Company's Profitability Professional, which offers a good breadth of functions and is easy to modify if you're familiar with HyperTalk. I hope, however, that the publishers rewrite the documentation, which is skimpy and less comprehensive than many of its competitors'.



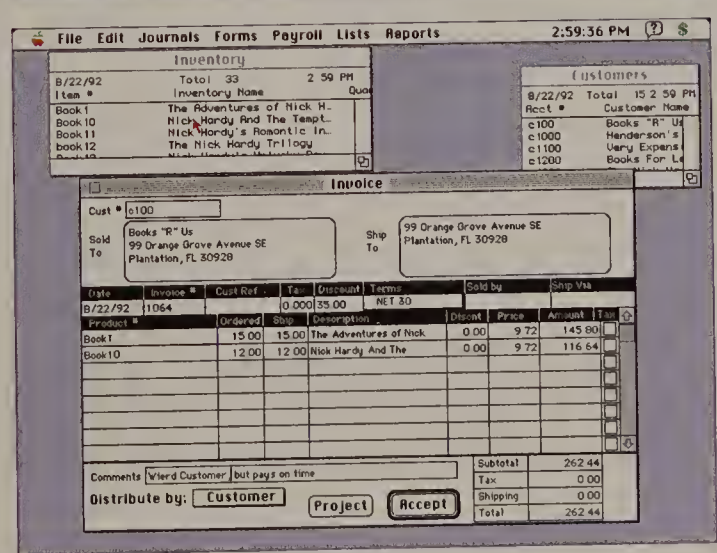
Intuit Intuit presents you with a desktop check register for entering payments and deposits. More complex transactions can be split into multiple accounts.



Great Plains Accounting In Great Plains Accounting, you can post recurring batches of transactions, as shown here, and then post them monthly to avoid duplication of effort.



M.Y.O.B. Like Managing Your Money, M.Y.O.B displays a navigation map when you first start up the program. Similar graphic devices are used throughout the program, such as a card file metaphor for organizing the chart of accounts.



Accountant, Inc. Accountant, Inc. uses a variety of lookup lists, such as customer and inventory lists, to simplify data entry. The program also calculates many values, such as sales tax and invoice totals, for you.

For the Knowledgeable Bookkeeper

HARRY BIGBIZ IS ADDING AN ADMINISTRATION group to his company. When Harry started the company, he used an all-in-one accounting program that he maintained in his spare time. Then he hired a second and third person to do the books. Now he needs to better organize the work duties, so he's bringing in his brother-in-law Charlie, who managed a financial department in a large corporation, to set up a dedicated administrative department.

Charlie evaluates the situation and decides that he will divide the work into several functional areas. He plans to have one person manage the payables and

ACCOUNTING MATRIX

	ALL-IN-ONE APPLICATIONS								
	Accountant, Inc. 3.0.1	ACCPAC Simply Accounting 1.38	Business Sense Integrated Accounting Software	Checkmark MultiLedger 2.0 and Payroll 4.6	In-House Accountant 1.2	M.Y.O.B. 3.0	Peachtree Accounting for Macintosh 1.30	Profitability Professional 1.7	Simple Accounting Plus 2.0
Company	Softsync	Computer Associates	Business Sense	CheckMark Software	In-House Software	Teleware	Peachtree Software	Wetzel & Company	Signature Systems
General Ledger	●	●	●	●	●	●	●	●	●
Chart of accounts	●	●	●	●	●	●	●	●	●
Sample set provided	●	●	●	●	●	●	●	●	●
Automatic reversals	○	○	●	●	○	●	●	●	●
Enter prior-period transactions	●	●	●	●	●	●	●	●	○
Budgeting	●	○	●	●	●	●	●	○	●
Accounts receivable	●	●	●	●	●	●	●	●	●
Calculates finance charges	●	●	●	●	○	○	○	●	○
Provides customer credit limits	●	●	●	●	○	●	●	●	●
Tracks (by salesperson/ by commision)	●/○	○/○	●/●	●/●	○/○	●/○	○/○	○/○	○/○
Separate bill-to and ship-to addresses	●	●	●	●	○	●	●	●	○
Prints dunning messages	○	●	○	○	○	○	●	●	○
Accounting method (cash/accrual)	accrual	accrual	cash, accrual	cash, accrual	cash, accrual	cash, accrual	accrual	cash, accrual	cash, accrual
Accounts payable	●	●	●	●	●	●	●	●	●
Allows entry of prior-dated invoices	●	●	●	●	●	●	●	●	●
Stores transactions by invoice number	●	●	●	●	●	●	○	●	●
assigned document number	●	●	●	●	●	●	●	●	○
date	●	●	●	●	●	●	○	●	●
Batches invoices for payment	●	○	●	●	●	●	●	●	○
Allows user-defined memos on checks	●	●	○	●	○	●	●	○	●
Integrated payroll	●	●	●	●	○	○	●	○	○
Integrated inventory	●	●	○	●	●	●	○	●	○
Integrated profit centers	●	○	●	●	○	●	●	●	○
Integrated job tracking	●	●	●	●	○	●	○	●	○
Integrated export capability	●	●	●	●	●	●	●	●	●
Integrated import capability	●	●	●	●	○	●	●	○	○
Multiuser version available	$995[1]	○	○	$695	○	○	○	○	○
List price (single user)	$595	$199	$199	$395	$199	$249	$99	$249	$99.95

● = yes; ○ = no. [1] Some modules cost more. [2] Price per module. [3] $50 per user. [4] $695 for enhanced version. [5] With source code $695.

receivables, then to add another person later. Another person will handle payroll. Charlie will manage the general ledger himself, and he will have another person in the warehouse take care of sales processing and inventory.

At this point, Charlie does not want to get involved with a multiuser network because of the cost and the additional work involved in system support. After studying the multiuser versions of Softsync's Accountant and CheckMark's MultiLedger and Payroll programs, he determines they would be perfect for a one-, two-, or maybe three-person group, but they won't be adequate, or provide growing room, for all the functions he plans to spread out over five or more people in different locations. He therefore decides to go with a separate-module bookkeeping sys-

MODULAR APPLICATIONS

A4 Accounting 3.2	Avenue Accounting Collection	Aware 5	Components 1.05	Computer-ized Classic Accounting 3.0	Flexware II 6.92	Great Plains Accounting	Manapro Accounting Software	Multiuser Desktop Accounting	Peachtree Insight Account-ing for Macintosh	SBT Mac Series Six Plus
Softek Design	Lake Avenue Software	Database International	Saton Software	Absolute Solutions	Flexware	Great Plains Software	Manapro	Logisoft	Peachtree Software	SBT Corporation
●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
○	●	●	○	○	○	●	○	●	●	●
●	●	●	●	●	○	●	○	●	●	●
●	●	●	●	●	●	●	○	●	●	●
●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	○	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/○
●	●	●	●	●	●	●	●	●	●	●
○	○	●	○	●	●	○	●	●	●	○
accrual	cash, accrual	accrual	cash, accrual	cash, accrual	accrual	accrual	cash, accrual	cash, accrual	cash, accrual	accrual
●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	○	●	●	●	●	●
●	●	●	●	●	●	●	●	●	○	●
●	○	●	●	●	●	●	●	○	○	●
●	●	●	●	●	○	●	●	●	●	●
●	●	●	●	●	○	●	●	●	●	●
○	●	○	●	●	●	●	●	○	●	●
○	●	●	○	●	●	●	●	○	●	●
●	●	●	(in A/R)	●	●	●	●	●	●	●
●	●	(Depts/Div)	●	○	●	●	○	○	●	●
limited	●	●	○	●	●	●	○	○	○	○
●	●	●	●	● (Excel)	●	●	●	●	●	●
●	●	●	●	● (Excel)	●	●	●	●	●	●
$1595 [1]	$695 [2]	$995	○	● [3]	$695–$895 [2]	$795 [2]	○	$2795	○	$695 [2]
NA	$495 [2]	$995 [2]	$795 [2]	$195 [4]	$695–$895 [2]	$795 [2]	$525 [2]	$1795	$395	$295 [5]

tem where he collects the data files on disk at the end of each workday and posts them to the general ledger. He will create reports from this general ledger daily and distribute them to Harry Bigbiz and the other department heads.

If Charlie comes from a traditional accounting background, he will probably like Absolute Solutions' Computerized Classic Accounting, which replicates traditional accounting forms on screen. If Charlie is looking for a multimodule program that makes excellent use of the Macintosh interface, he will like Peachtree Insight Accounting for Macintosh. (If you are considering expanding to a network operation, however, the Insight series is not for you; it is limited to single users.)

Charlie should also check out Satori Software's

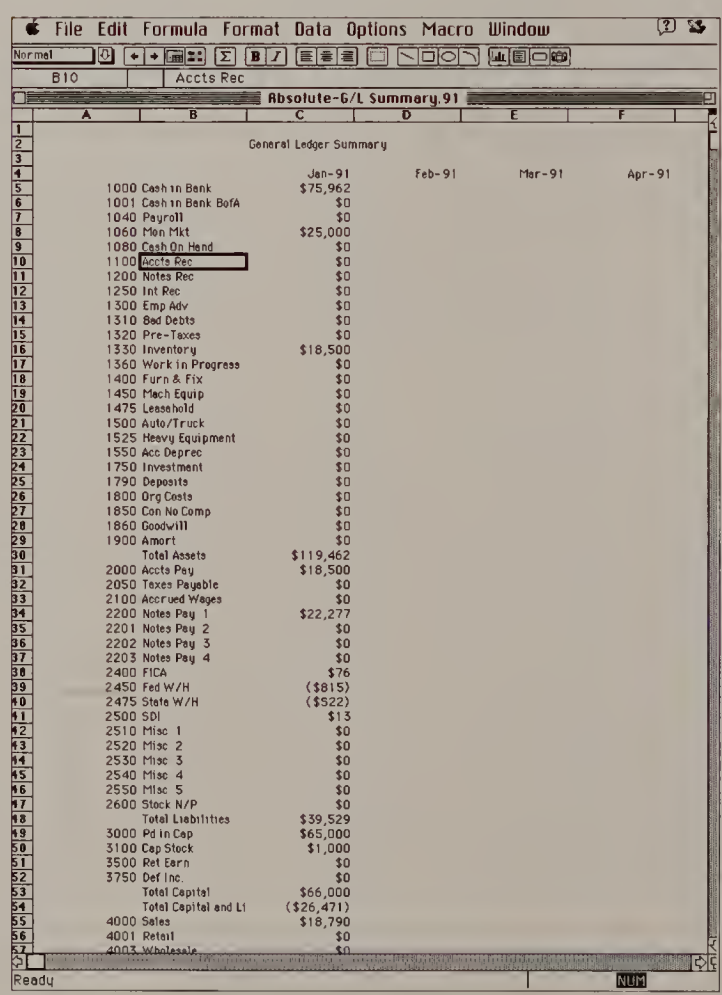
Components, which offers clean menus and a great deal of flexibility in designing forms and reports. Satori, however, does not yet offer an integrated payroll module, and Components' inventory segment is part of the accounts receivable module rather than being a dedicated module. In Charlie's case, this means an awkward situation because he has two people handling sales processing and inventory and receivables, and it would be awkward for the two of them to share the same module at the same time. (Satori does, however, offer a dedicated job-cost and time-billing module.)

training and support to users.

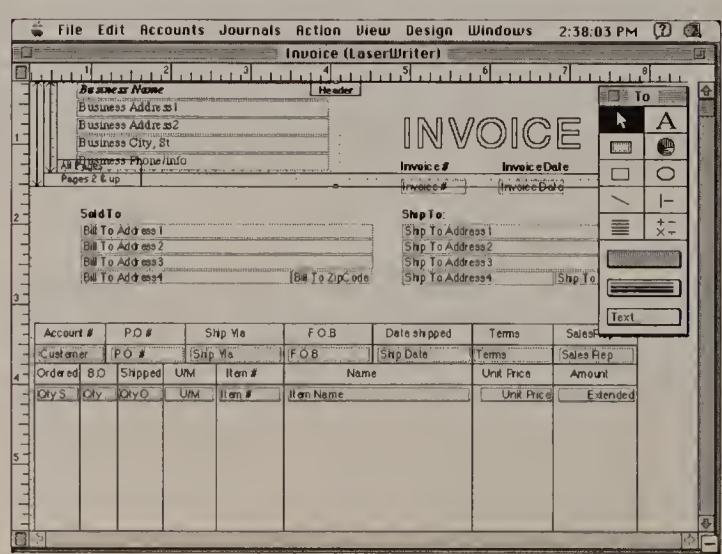
On the basis of content alone (ignoring the Mac interface), virtually all of the programs with separate modules are worth examining, by comparing the programs' dedicated function modules to your specific needs. SBT Corporation's SBT Mac Series Six Plus has excellent depth and breadth, and the programs, which run under FoxBase+/Mac, can be easily customized by dBase or FoxBase programmers. And Lake Avenue Software's Avenue Accounting Collection, which looks like a mainframe program, has a solid content base.

Accounting is one area where one size doesn't fit all—the key to finding the right package is understanding your needs

If Charlie wants to concentrate on content rather than interface, I highly recommend the Great Plains Accounting series. The series has a first-rate lineup of dedicated modules whose various accounting functions can easily be used by different individuals or groups. Great Plains Software provides excellent



Classic Accounting Computerized Classic Accounting emulates traditional bookkeeping forms, as illustrated by the General Ledger Summary screen.



Components One of Components' greatest strengths is its View feature. Using Views, you can create any form or report you can imagine in a simple, MacDraw-like environment with an easy-to-understand tool palette.

The Manapro Accounting Software series is interesting because it runs in six languages (all included in the basic package), offers a money-back guarantee, and has an electronic manual on screen that explains how to use the program as well as some basic accounting terms and procedures. I also like the accounts receivable module, which makes it easy to write dunning letters. In actual overall use, however, Manapro is disappointing. The documentation is skimpy, covers only highlights, and doesn't even have an index. The electronic manual is skimpy as well, and the little information provided is more elusive than illuminating.

Programs for Multiple Users

ALTHOUGH HARRY BIGBIZ IS NOT YET READY FOR a networked environment, he may grow into one as his number of machines and users increases. When Harry gets to the point where moving data by disk becomes a logistical problem because of having many machines to keep track of, in separate locations to boot, it will be time for him to form a small network.

He will be concerned with things like user training, cables and connections, servers, and having the resources (both money and people) to maintain the machines and keep the software current. These tasks, which single or small-group users hardly think about, become critical in a networked operation. Harry will also (unfortunately) become familiar with downtime, security, and service. At that point, Harry will be entering the world of Julia C. Corporate, who is about to convert a network of mainframe users to a Macintosh network.

If Julie C. Corporate does her homework, she will find that Flexware II is an outstanding network program with a complete line of dedicated modules, including general ledger, accounts receivable, accounts payable, payroll, and inventory. In addition, the program offers modules for order processing, job cost and analysis, purchasing, point of sale, service request, sales leads and tracking, and client-server management. It sports a nifty new graphical interface that makes excellent use of palettes and icons for navigating the segments (which is a big advantage over the previous interface). To get working quickly, Flexware offers training at its headquarters or by its resellers in the field.

The Great Plains Accounting series is also a terrific network program with a comprehensive line of

dedicated programs—beyond the general ledger, accounts payable, accounts receivable, payroll, and inventory—that includes the following: cash management, order entry, purchase order, job costing, and network management, plus a system manager, a client-server manager, and an import manager. It is strongly supported by both the company and resellers, and also offers training at its headquarters or by resellers and user groups in the field.

The SBT Mac Series Six Plus is also excellent, with its easily modifiable FoxBase+/Mac code. Beyond the basic general ledger, accounts payable, accounts receivable, and payroll programs, SBT also offers a complete range of dedicated modules: sales orders, purchase orders, fixed assets, job costing, manufacturing, property management, and time billing. SBT's interface is not Mac-like; a comprehensive menu bar brings up fairly standard MS-DOS–derived data entry screens that you navigate by pressing the tab and enter keys instead of using the mouse.

Logisoft's Multiuser Desktop Accounting (MDA) also caters to networks. MDA's Omnis 3 screens are adequate but show the need for upgrading. MDA, in addition to general ledger, accounts payable, accounts receivable, and inventory, offers purchases, sales orders and quotes, a representative sales-activity module, and invoicing. MDA does not offer its own payroll, but it allows you to integrate Aatrix Software's payroll with your general ledger.

The poorest interface of the multiuser products is from Lake Avenue Software's Avenue Accounting Collection. From an accounting standpoint, the series is highly competent; and the available dedicated modules (beyond general ledger, accounts payable, accounts receivable, payroll, and inventory) include financial reporting, order entry, job costing, invoicing, purchase orders, and bank-account reconciliation. These modules, like SBT's, also run under FoxBase+/Mac, but use of the mouse is practically nil, and the screens resemble mainframe entry screens.

Softek Design's A4 Accounting, based on ACIUS's 4th Dimension, offers separate modules for accounts payable and inventory, in addition to its core general ledger and accounts receivable program. A4 does not offer a payroll module. You have the advantage of working with an easily modifiable 4D code, but you have to contend with 4D, which is even slower on a network than on a single-user machine.

PERSONAL-FINANCE PROGRAMS

	Checkwriter 4/0	MacMoney 3.5	Managing Your Money 5.0	Quicken 3.0
Company	Aatrix Software	Survivor Software	MECA Software	Intuit
Price	$69	$119.95	$79.95	$69.95
Tracks assets, liability, income, and expenses	●	●	●	●
Calculates and amortizes loans	●	●	●	○
Has dedicated invoices	○	○[1]	○	○
Has dedicated payroll	○[2]	○	○	○
Electronic bill transfer	○	○	●	●
Recurring bill payments	●	●	●	●
Exports data to MacInTax	●	●	●	●
Reconciles checking account	●	●	●	●
Tracks credit purchases	●	●	●	●
Has calendar and to-do list	●	○	●	○
Offers free unlimited support	●	●	●	●

● = yes; ○ = no. [1] *Available for $99.95.* [2] *Available for $199.*

Making the Right Choice

FOR THE BUSINESS-ACCOUNTING PROGRAMS, AT A minimum you should have a 68030-based machine with 2MB of RAM (4MB if you're using System 7) and a 40MB hard drive. Although many programs require less power and space, you may find yourself limited in upgrades if you have less RAM and hard drive space.

Large monitors are not necessary in bookkeeping programs but can be convenient in looking at on-screen reports and doing checking-account reconciliations (assuming the application allows you to use a full screen) because a large monitor eliminates a lot of scrolling.

Accounting is an area where one size doesn't fit all. The key to finding the right package is understanding what your needs are today, and what they'll probably be tomorrow. And always consult with your accountant when choosing an accounting application and make sure that he or she will be able to use the data that you will be sending. See "Editors' Choice" for my recommendations of accounting packages likely to work for most people looking for single-user (with and without payroll), multiple-user, and networkable products. In 1992, one thing is certain: if you do your homework, there's an accounting package out there for you. **m**

See *Where to Buy* for contact information.

ALAN L. SLAY specializes in covering financial and accounting software and has been writing for *Macworld* since 1988.

MW EDITORS' CHOICE

Single-User Accounting (without payroll)

M.Y.O.B. For the single user who needs an all-in-one program, I recommend M.Y.O.B. **Company:** Teleware. **List price:** $249.

Single-User Accounting (with payroll)

Checkmark MultiLedger and Payroll If you need a payroll function, I recommend this combination. **Company:** CheckMark Software. **List price:** $395.

Accountant, Inc. This program also provides payroll functions. **Company:** Softsync. **List price:** $595.

Multiuser or Network Accounting

Flexware II My first choice, because of its superior interface and wide range of dedicated functions. **Company:** Flexware. **List price:** $695 to $895 per module.

Great Plains Accounting This program also has an excellent range of dedicated functions. **Company:** Great Plains Software. **List price:** $795 per module.

Optical Update

by Charles Piller

Photos by John William Lund

OPTICAL DRIVES ARE GETTING FASTER—AND MORE AFFORDABLE

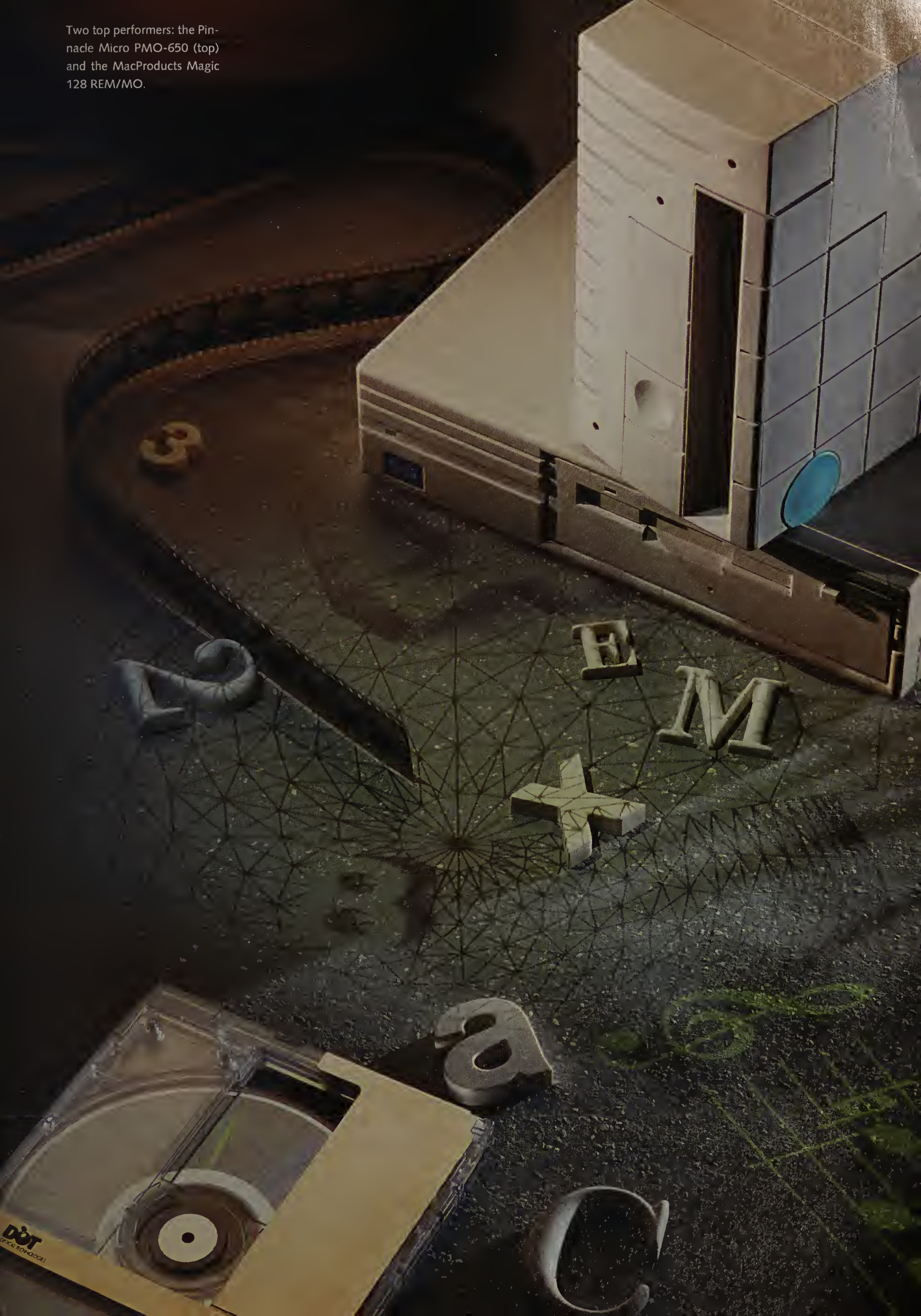
WHEN A STORAGE DEVICE—WHATEVER THE MEDIUM—OUTPACES ITS CLOSEST DIRECT COMPETITORS BY AS MUCH AS 10 PERCENT, IT'S WORTH NOTING. BUT WHEN THAT STORAGE DEVICE IS A REWRITABLE OPTICAL DISK DRIVE—THE SLOWEST RANDOM-ACCESS STORAGE MEDIA AROUND—IT'S PARTICULARLY WELCOME NEWS.

AMONG REWRITABLE OPTICALS, PINNACLE MICRO'S NEW PMO-650 OFFERS A REMARKABLE 16 PERCENT LEAD OVER ITS NEAREST OPTICAL COMPETITOR AND IS AT LEAST 27 PERCENT FASTER THAN ALL BUT ONE OTHER DRIVE TESTED BY MACWORLD LAB. NOTWITHSTANDING PINNACLE'S HIGHLY INFLATED CLAIMS THAT THE PMO-650 IS UP TO FIVE TIMES AS FAST AS DRIVES BASED ON A POPULAR SONY MECHANISM, AND FASTER THAN MOST HARD drives, our tests show that its performance is close to that of low-end hard drives. While not revolutionary, this is certainly an encouraging sign that opticals are becoming more competitive.

There have been other important developments since *Macworld* last tested rewritable optical drives, in our June 1991 issue. At that time, only one unit in the 3½-inch form factor was available; today there are 30 to choose from—with many selling for less than $1500. And those small, speedy units have helped push down prices of the older 5¼-inch units; last year they cost $4600 on average, and today you can choose among several models under $3000.

It's too soon to consider throwing out your hard drive, but for convenient, long-term, high-capacity archiving; for network backup; and for transporting huge color images between offices, optical drives are an increasingly attractive option.

Macworld Lab compared the relative performance of 43 optical drives, from 3½-inch units with 128MB capacities to 5¼-inch drives capable of storing up to 1GB of data. We tested them on everyday optical drive functions such as reads and writes, as well as on typical tasks, including copying large files and opening them in Adobe Photoshop and Aldus PageMaker. We informally tested each drive's handling of QuickTime—optical drives are a logical solution to the heavy storage requirements involved in displaying a QuickTime movie—and found that all drives offer adequate playback.



Two top performers: the Pinnacle Micro PMO-650 (top) and the MacProducts Magic 128 REM/MO.

How Opticals Work

MOST ERASABLE OPTICAL DRIVES ARE based on *magneto-optical* (MO) mechanisms. With MO drives, a high-power laser heats up a spot on the disk platter; when the metal oxides in that spot are hot, their magnetic orientation can be altered. A magnet operating on the opposite side of the disk determines each spot's 0 or 1 orientation. Once cooled, the media can't be altered by magnetic fields, which is why MO drives are a durable medium for archiving. When set on low power, the laser reads the magnetized spots without heating them.

Panasonic uses an alternate, *phase-change*, approach for some of its drives. This rewritable optical technology doesn't require magnetization. Instead, by heating the media, the high-power laser changes the structure of a spot, making it either crystalline or amorphous. These states have different reflective properties, so a low-power reading laser can differentiate them as 0s or 1s.

Both technologies use two-sided, 5¼-inch form-factor disks and can format them for capacities of about 300MB or 450MB per side, depending on the formatting method; like an old record album, you can "play" only one side of the disk's storage capacity at a time. The single-sided, 3½-inch, 128MB form factor is available only in the MO format and carries about 120MB of data after formatting.

Rewritable optical drives owe their huge capacity to the precision of diode lasers. These lasers can focus on an area as small as 1 micron in length (one-millionth of a meter), thereby allowing optical drives to pack data much more densely than hard drives can.

Multifunction drives offer the ultimate in archiving flexibility by combining rewritable optical and the older write-once, read-many (WORM) formats in one drive (see "Opticals in the Spotlight" for a list of available multifunction drives). If you've already invested in a WORM drive (whose media can't be erased) and have many gigabytes of archives in storage, but want to move to rewritable technology without losing access to your old records, multifunction drives are the way to go. As for the massive storage needs of a major corporation or government agency, many vendors offer rewritable optical jukeboxes—robotic disk shufflers that have capacities up to 1000GB.

Rewritable optical media comes in two sizes—3½-inch, which holds 128MB or 256MB of data; and 5¼-inch, which holds 650MB or 1GB.

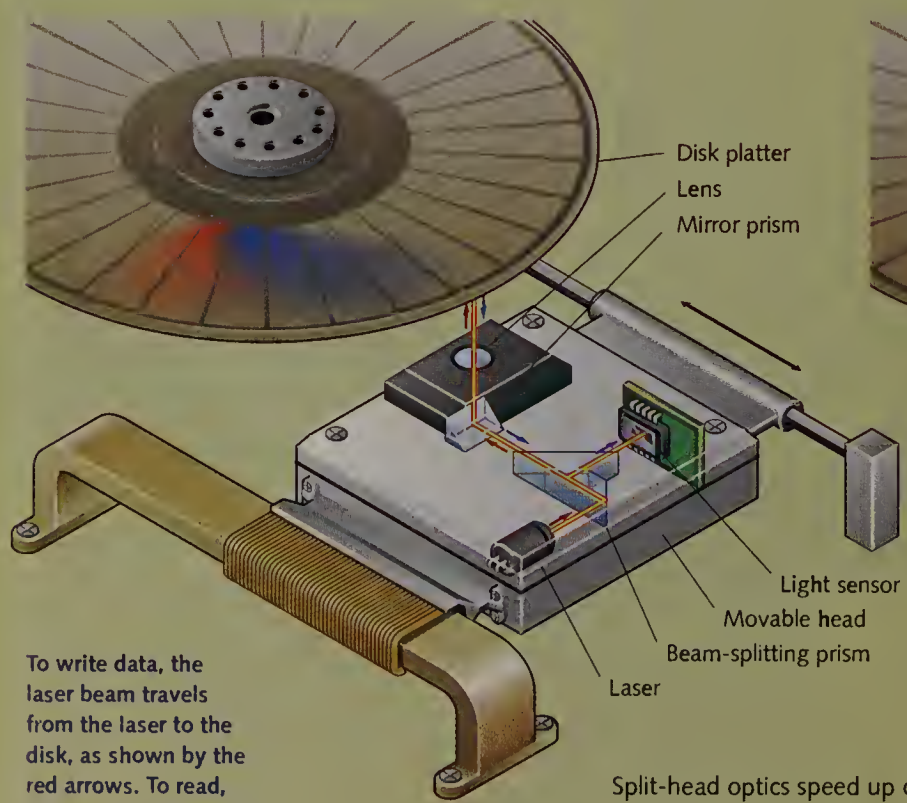
The Advantages of Optical

REWRITABLE OPTICAL DRIVES ARE A logical solution, primarily for long-term storage and easy transport of large files, such as customer databases, multimedia presentations, complex color images, or CAD drawings, and are a good choice for nightly network backup. But why choose rewritable optical technology over tape drives, WORM drives, removable hard drive cartridges, or removable Winchester-style hard drives?

Rewritable opticals offer a unique combination of characteristics that allow more-flexible archiving than competing technologies do. Like hard drives, optical disks can be overwritten 100,000 or more times, can be mounted on the desktop, or can be designated as the start-up device. Like WORM drives, rewritable optical disks are impervious to magnetic fields

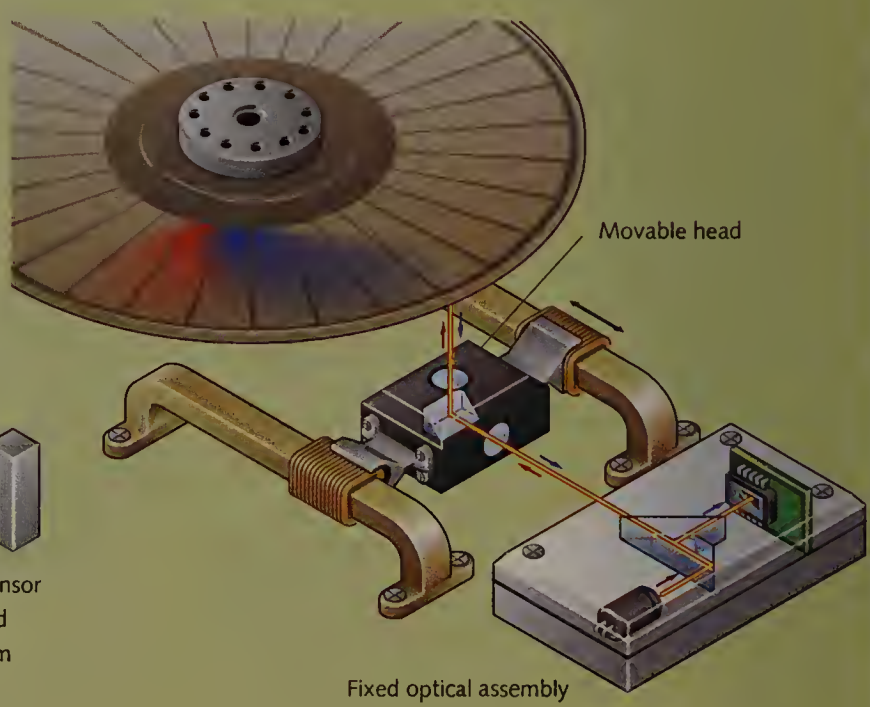
The Split-Head Optical Advantage

Single-head optics



To write data, the laser beam travels from the laser to the disk, as shown by the red arrows. To read, the beam reflects off the disk and is returned to the light sensor, as shown by the blue arrows.

Split-head optics



Split-head optics speed up optical drives by improving drive-head engineering. Conventional optical drives place all optical components on a relatively large and heavy movable head that is hard to start, position, and stop quickly. A new, split-head design produced for Ricoh and Pinnacle (who add their own electronic circuitry), and a similar approach used in drives based on the Max-Optix Tahiti II mechanism, sets the laser, beam-splitting prism, and light sensor in a fixed position—leaving the movable head with a light, easy-to-maneuver prism and lens.

MW LAB Optical Performance Tests

Color Key

- Fastest

Percent slower than fastest

- Up to10%
- 11%–20%
- 21%–29%
- 30% or more

The drives are listed from best overall performance (top) to worst. To determine rankings, we indexed overall performance numbers against the fastest drive. Index numbers are to the left of product names.

We measured each drive's ability to duplicate a 3.2MB 4th Dimension file, write a 3.2MB file to the optical disk, read a 3.2MB file on the optical disk, open and save a 3.9MB Photoshop file, open and save a 2.6MB PageMaker file, and conduct a 73.4MB Retrospect backup consisting of many files.

In the noise tests, the lower the decibel level, the quieter the drive. We found that drives with decibel levels in the upper 40s were noisy enough to be irritating in our office environment.

Mechanism codes are in parentheses following product names. H = Hewlett-Packard; I = IBM; M = MaxOptix; MA = Matsushita; MO = MOST; PI = Pinnacle; PIO = Pioneer; R = Ricoh; S = Sony.

Overall Fastest	Duplicate (in seconds)	Write (in seconds)	Read (in seconds)	Open Photoshop (in seconds)	Save Photoshop (in seconds)	Open PageMaker (in seconds)	Save PageMaker (in seconds)	Retrospect Backup (in seconds)	Sound (in dBs)
1.00 Pinnacle Micro PMO-650 (PI)	33.49	18.29	17.88	27.77	23.75	46.66	62.4	461.0	42.2
0.86 PLI Infinity Max Optical (M)	44.72	26.60	19.11	32.25	28.64	49.61	106.8	464.4	42.1
0.79 MacDirect NuDesign Optical (MO)	47.19	33.98	15.91	36.64	35.91	50.90	142.3	570.8	43.1
0.79 Liberty Systems 115MO (MO)	48.11	33.40	15.74	37.99	36.51	52.35	128.8	568.3	40.8
0.79 DGR Technologies 128REM (MO)	47.58	33.68	15.79	36.77	36.33	51.13	145.6	570.4	38.0
0.79 Ocean Microsystems Vista 128 (MO)	48.59	34.57	15.83	36.62	36.15	51.56	145.6	571.9	45.2
0.79 MacProducts Magic 128 REM/MO (MO)	48.13	34.15	15.88	36.86	36.34	51.62	146.5	572.8	36.1
0.77 Generation Systems 128MB Optical (MO)	48.17	33.85	18.11	36.99	35.99	51.83	147.3	569.9	40.7
0.77 Mirror Technologies 128MB Optical (MO)	48.25	33.74	18.41	37.35	36.68	52.16	147.5	568.9	42.4
0.76 Relax Erasable Optical Vista Hyperspace (R)	49.95	31.89	21.86	38.16	31.13	62.93	147.0	518.0	50.6
0.75 Storage Dimensions MCO1-1000 (M)	56.45	37.05	19.44	36.60	35.94	50.36	140.5	617.7	50.2
0.72 Pinnacle Micro REO-130S (S)	54.27	33.23	25.14	40.82	36.18	62.60	158.9	566.2	50.8
0.72 Sony RMO-S350 (S)	54.18	33.11	24.81	41.64	36.33	63.20	160.6	559.5	47.5
0.71 PLI Infinity Optical 3.5" (S)	53.81	33.20	24.78	42.91	38.77	63.31	160.7	557.5	43.4
0.71 Optima Technology DisKovery 128 (S)	54.60	33.11	25.31	43.16	36.47	68.13	160.9	564.7	49.1
0.70 Relax 128MB Optical Sierra (R)	54.12	37.46	20.58	42.30	40.17	58.62	171.9	680.2	39.7
0.70 Tulin Technology A-Hive Jr. MO-120 (R)	54.24	37.18	20.24	42.54	40.72	58.60	175.3	680.7	45.7
0.70 Mass Microsystems DataPak MO/128 (MA)	54.32	37.18	20.09	42.60	40.97	58.79	176.8	679.9	38.6
0.70 La Cie 128MB Cirrus Optical (MA)	54.31	37.37	20.24	42.60	41.43	58.30	173.4	679.9	42.4
0.70 TASS Optical World PL128 (MA)	54.18	37.59	20.45	42.83	40.65	58.96	178.5	679.1	42.0
0.70 Rodime Systems Condor 650e (R)	57.71	39.18	21.66	40.91	37.64	63.54	165.1	640.3	42.6
0.70 Rodime Systems Condor 130e (R)	54.82	37.68	20.62	43.07	41.15	59.46	175.6	698.4	40.7
0.69 Procom Technology MEOD128 (M)	54.54	34.68	24.75	42.97	37.09	68.74	212.8	578.1	48.7
0.69 MicroNet Technology SB-TMO-1000 (M)	61.96	39.30	20.26	38.59	39.74	67.78	185.1	684.8	40.7
0.68 Optical Access Access RD/Aria (MA)	58.17	38.81	20.75	45.85	43.82	59.41	176.2	709.6	40.3
0.67 UnBound OptiStor-HS (R)	62.68	39.53	23.99	44.23	39.16	66.88	177.1	677.8	47.1
0.67 Optical Access Access MF/Gigabyte (MA)	73.70	30.71	21.15	45.32	46.25	73.56	317.7	555.0	48.2
0.66 CMS Enhancements PMO 600 (S)	64.33	42.57	24.91	47.78	43.99	68.69	159.5	627.6	42.9
0.65 MicroNet Technology SB-SMO-1 (S)	66.38	42.88	26.78	44.33	41.69	68.73	217.5	627.3	38.9
0.65 FWB hammerDisk600S (S)	66.78	42.75	26.73	46.14	41.82	68.44	218.9	624.1	42.0
0.64 Optima Technology Concorde 600 (S)	69.48	42.91	26.68	46.38	42.05	70.19	219.5	621.0	39.7
0.64 PLI Infinity Optical 5.25" (S)	67.09	42.80	27.00	48.08	44.78	68.47	216.6	620.1	45.3
0.64 Third Wave Computing OptiDisk 600 (S)	66.39	42.58	26.94	48.10	44.80	69.09	215.9	627.0	43.0
0.64 La Cie ZFP+ 600 (S)	67.84	42.81	26.67	48.18	44.74	68.64	218.9	630.1	42.7
0.64 Maximum Storage Duette System 5 (MA)	87.26	30.80	21.19	44.84	46.39	72.84	310.1	744.5	50.3
0.63 Procom Technology MEOD650 (M)	68.05	42.81	26.53	48.89	44.68	72.03	227.5	638.3	44.3
0.63 MicroNet Technology MO-128 (S)	64.50	42.29	24.90	49.70	48.74	72.41	188.7	754.7	47.5
0.63 Plasmon Data Systems RF-7010 (MA)	89.19	35.98	21.30	45.45	46.26	73.95	317.5	751.3	39.5
0.60 Storage Dimensions MCEI-650 (S)	78.08	53.27	26.79	50.32	51.30	68.19	246.3	806.6	45.9
0.56 Core International RM 128 (I)	82.85	56.29	26.85	56.39	58.53	77.07	254.1	933.1	39.0
0.56 Hewlett-Packard 650C Stand Alone Disk Drive (H)	97.01	40.40	26.47	61.51	62.64	78.58	280.4	907.9	47.2
0.54 Relax Pioneer Multi-Function Vista (PIO)	84.80	53.94	27.97	61.58	66.40	86.21	357.8	908.9	45.4
0.52 Relax Erasable Optical Vista E-I (R)	95.14	60.16	32.59	63.37	66.17	90.27	316.6	967.7	49.5

that can destroy data on a hard drive.

As a removable medium, an optical disk, like a tape cassette, is space-saving and convenient. Tape drives are the least expensive option for routine network backup, but being random-access devices, opticals are faster and easier to use. If you need to gain access to backup files, you can go right to them on an optical disk, as opposed to having to patiently wind your way to them on a backup tape.

Optical drives represent one of the few easy solutions for people who generate large files and work in more than one office. Desktop publishers who routinely transport 150MB or more in color images to a service bureau for output can store them on one optical cartridge, rather than splitting the job among two or more removable 90MB hard drive cartridges. Although most Macintosh-based service bureaus still use SyQuest or Bernoulli removable-cartridge drives, many are beginning to invest in optical drives. Chances are your bureau's drive can read your disk (most optical drives today will read, if not write to, an optical cartridge formatted on a competitor's drive).

To be sure, optical drives cost much more than their usual competitor, removable cartridges (which are often available for under $1000). But optical media cost as little as 13 cents per megabyte, while removable hard drive cartridges come in at about $1.25 per megabyte (see "Removable Storage," elsewhere in this issue).

But Why So Slow?

THE RELATIVELY SLUGGISH PERFORmance of optical drives derives from three factors. Unlike hard drives, which overwrite data directly, MO drives normally use a three-pass system that first erases data on a portion of the disk, then writes new data, and on a third pass verifies that the data is correct. Panasonic's phase-change mechanism overwrites without first erasing—which when used with efficient software and firmware, theoretically should speed up performance over MO drives. But direct overwrite did not result

in speed benefits for the phase-change drives we tested, the Maximum Storage Duette System 5 and the Optical Access International Access MF/Gigabyte.

Second, because laser head assemblies are expensive, optical drives contain just one assembly—unlike hard drives, which can achieve superior read-write times by operating on multiple platters simultaneously. Finally, laser head assemblies are larger and heavier than hard drives' magnetic heads, which can move more rapidly across the platter and stop more quickly.

Among the standout drives are the PLI Infinity Max Optical (left) and the MacDirect NuDesign Optical.

Nonetheless, the faster units in the higher-capacity 5¼-inch form factor we tested can also be used effectively as network servers for businesses that distribute large database files or graphics. For example, *Macworld* uses a rewritable optical drive with its international file server; foreign editions of the magazine dial in to download graphics or articles used in the U.S. magazine.

Increasing Speed

A CRITICAL FACTOR IN SPEEDING UP MO drives involves the verify cycle used to maintain data integrity; some vendors ship with the verify turned on, others with it turned off. With verify off, drive performance improved up to 28 percent in our spot tests. Macworld Lab tests were conducted, as usual, with all features in the default position—that's the way the consumer receives the product, and most consumers use the product just as shipped.

Most of the drives come with a DIP switch or software that allows you to turn verification on or off. Among the units we tested, those from Core International, Generation Systems, Mass Microsystems, Mirror Technologies, Procom Technology, and Relax Technology don't allow you to change the factory setting. With the Procom and Relax drives, that's a real problem, because they ship with verification off. Avoid buying units from those companies if you want maximum data security. Anyone using a drive with verify turned off should beware—even a tiny error in some files, such as a financial database or medical image, can render the rest of the data almost worthless.

RAM caches are another way to speed up optical drives. Caches improve write performance by reading data from the computer into RAM at a much faster rate than the optical media can accept it, then writing the data to the disk while handling the next demand from the computer. Caches can reduce read times by *prefetching*—reading more data than was requested by the Mac. In this way cache algorithms try to guess what the Mac will ask for next. If the prefetch does contain the next block of data requested, the Mac can read that data at high speed directly out of the cache. This eliminates the need to go back to the poky disk.

The more efficient the algorithms that control the cache, the better the cache's performance. Cache sizes vary widely, from as little as 64K to the Pinnacle Micro PMO-650's whopping 4MB. (Drives based on a new MaxOptix Tahiti IIm mechanism, which offers a 4MB cache option, should be available when you read this.)The larger the cache, the more potential it offers for time savings on larger files.

A recent innovation, *split-head optics*, is also geared to help boost an optical drive's performance. Most optical heads consist of a heavy laser, two prisms, a light sensor and a lens mounted on a movable arm—the size and weight of that assembly is hard to move fast or stop suddenly, as needed to improve read-write performance. With split-head optics, the laser, one prism, and the sensor are fixed, leaving only the lens and one prism on the moving head (see "The Split-Head Optical Advantage"). This lighter head produces faster seek times. All the fastest drives in the 5¼ form factor—the PMO-650 and drives based on the new Ricoh HyperSpace and MaxOptix Tahiti II mechanisms—use split-head optics with evident success. Previous Ricoh mechanisms were generally slower and cheaper than their Sony counterparts. But the Ricoh HyperSpace–based Relax Erasable Optical Vista HyperSpace, UnBound OptiStor-HS and Rodime Systems Condor 650e have leapfrogged Sony performance while keeping prices competitive.

Eighteen months ago, most optical drives used a 2400-revolutions-per-minute *spindle speed*—the rate at which the disk platter turns—and only one rewritable optical unit offered 3600 rpm. Now a number of drives, including the PMO-650 as well as those based on the Ricoh HyperSpace, employ the faster rate. Some vendors, including MacProducts USA, DGR, and FWB, recently began shipping the first 3½-inch drives that spin at 3600 rpm. Those drives, based on an Epson mechanism, didn't reach the market in time for our lab tests, but we looked at a prerelease unit that showed the fastest performance in the 3½-inch market, although still below the Pinnacle PMO-650's speed.

Faster spindle speed can be helpful, but it's far from the defining factor in drive performance. The MaxOptix Tahiti II mechanism, used in PLI's Infinity Max Optical, Storage Dimensions' MCO1-1000 NR, and MicroNet's SB-TMO-1000, runs at 2200 rpm. Yet the drives from PLI and Storage Dimensions finished near the top of the pack for 5¼-inch form factor, in part due to a highly efficient formatting scheme.

Ease of Use

SPEED SHOULD BE ONLY ONE FACTOR in your decision about which rewritable optical drive to buy. Ease of use is important, too, and it begins by reducing the annoyance you can encounter simply trying to mount the drive on the Macintosh desktop. While most mechanisms don't mount automatically, all the units we tested include either an INIT or a simple application to mount the drive. We had the most problems mounting two drives from Relax, the Erasable Optical Vista HyperSpace and Erasable Optical Vista E-I (based on an older, slower Ricoh mechanism); Optima's Concord 600; Core International's RM 128; La Cie's ZFP+ 600; Optical Access's Access RD Aria; Pin-

OPTICALS IN THE SPOTLIGHT

Company	Product/Mechanism	Size (in inches)/ Capacity	Technology[1]	Tested	Price[2]	Termination	Warranty (in months)	Toll-Free Support	Support Score
Adara[3]	9200EII/Ricoh or Sony	5.25/650MB	MO	○	$1799 (R); $2599 (S)	switchable	12	●	not tested
Alphatronix	Inspire/Alphatronix	5.25/650MB	MO	○	$5745 and up	external	12	●	not tested
CharisMac Engineering	Tahiti TMTIIm/MO	5.25/650MB (512) or 1GB (1024)	M	○	$3550	external	12	●	not tested
	Tahiti TMTII/MO	5.25/650MB (512) or 1GB (1024)	MO	○	$3450	external	12	●	not tested
CMS Enhancements	PMO 600/Sony	5.25/650MB	MO	●	$4539	external	12	○	poor
Computer Upgrade Corporation	Omnistor/Pioneer	5.25/650MB	M	○	$3625	switchable	12	●	not tested
Core International	RM 128/IBM	5.25/128MB	MO	●	$2320	internal	12	○	poor
Deltaic Systems	Optiserver/HP	5.25/650MB	MO	○	$2999	external	12	●	not tested
	Optiserver/Ricoh	5.25/650MB	MO	○	$2599	external	12	●	not tested
DGR Technologies	DGR 12BREM/MOST	3.5/128MB	MO	●	$1199	external	12	●	satisfactory
	DGR 128 Turbo/Epson-Seiko	3.5/128MB	MO	○	$1299	external	12	●	satisfactory
	DGR 256REM/MOST	3.5/256MB	MO	○	$1699	external	12	●	satisfactory
DJK Development	TEO-2/MaxOptix	5.25/1GB	MO	○	$3890	external	12	○	not tested
ETC Peripherals	ETC DataDrive 128MO/Teac	3.5/128MB	MO	○	$1449	external	12	●	not tested
	ETC DataDrive 650MO/Sony	5.25/650MB	MO	○	$2995	external	12	●	not tested
FWB	hammerDisk130/Panasonic or Epson	3.5/128MB	MO	○	$1999 (P); $2099 (E)	external	12	○	poor
	hammerDisk600S/Sony	5.25/650MB	MO	●	$4339	external	12	○	poor
Generation Systems	128MB Optical/MOST	3.5/128MB	MO	●	$2595	external	12	●	satisfactory
Hewlett-Packard	650M Stand Alone Disk Drive/Sony	5.25/650MB	M, MO	○	$5220	external	distributor dependent	○	dealer support only
	650C Stand Alone Disk Drive/HP	5.25/650MB	M, MO	●	$4683	external	distributor dependent	○	dealer support only
La Cie	128MB Cirrus Optical/Matsushita	3.5/128MB	MO	●	$1699	internal	12	●	poor
	ZFP+ 600/Sony	5.25/650MB	MO	●	$3199	internal	12	●	poor
Liberty Systems	115MO/MOST	3.5/128MB	MO	●	$1339	internal	12	○	very good
	225MO/MOST	5.25/650MB depending on sector size	MO	○	$3137	switchable	12	○	very good
Loviél Computer Corporation	Erasable Optical 128/ Sony or MOST	3.5/128MB	MO	○	$2127 (S); $1999 (MO)	external	12	○	not tested
	Loviél Erasable Optical 650/S	5.25/650MB	MO	○	$4599	external	12	○	not tested
	Maxcess Erasable Optical 650/Sony	5.25/650MB	MO	○	$4599	external	12	○	not tested
MacDirect	NuDesign Optical/MOST	3.5/128MB	MO	●	$1298	switchable	12	○	very good
MacProducts USA	Magic 128 REM/MO/MOST or Magic 128 Turbo/Epson-Seiko	3.5/128MB (MO); 3.5/128MB (E)	MO	● (MO)	$1199 (MO); $1299 (E)	external	12	○	very good
	Magic 256REM/MOST	3.5/256MB	MO	○	$1699	external	12	○	very good
Mass Microsystems	DataPak MO/128/Matsushita or Sony (we tested Matsushita)	3.5/128MB	MO	●	$1799	external	12	●	poor
	DataPak MO/650/Sony	5.25/650MB	MO	○	$4299	external	12	●	poor
Maximum Storage	Duette System 5/Matsushita	5.25/1GB	P	●	$4050	switchable	3	○	poor
	Tahiti IIm/MaxOptix	5.25/650MB–1GB	M	○	$4695	internal	12	●	not tested
MicroNet Technology	MO-128/Sony	3.5/128MB	MO	●	$1995	external	12	○	very good
	SB-SMO-1/Sony	5.25/650MB	MO	●	$4644	external	12	○	very good
	SB-TMO-1000/MaxOptix	5.25/1GB	MO	●	$5604	external	12	○	very good
Microtech International	Genesis 120/IBM	5.25/120MB	MO	○	$1899	external	24	●	not tested
Mirror Technologies	Mirror128MB Optical/MOST	3.5/128MB	MO	●	$1399	external	12	○	poor
Ocean Microsystems	Tidalwave 650/Sony	5.25/650MB	MO	○	depends on configuration; lowest is $2695	external	12	●	poor
	Vista 128/MOST	3.5/128MB	MO	●	$1499	external	12	●	poor
	Vista 256/MO	3.5/256MB	MO	○	$1748	external	12	●	poor
Optical Access International	Access MF/Gigabyte/Masushita	5.25/1GB	P	●	$3995	internal	12	●	poor
	Access RD Aria/Matsushita	3.5/128MB	MO	●	$1995	external	12	●	poor
	Access RD Express/Ricoh	5.25/650MB	MO	○	$4495	external	12	●	poor
Optima Technology	Concord 600/Sony	5.25/650MB	MO	●	$2895	external	12	○	satisfactory
	DisKovery 128/Sony	3.5/128MB	MO	●	$1695	external	12	○	satisfactory
Panasonic Communications & Systems[4]	LF-3000/Panasonic	3.5/128MB	MO	○	$2284	switchable	12	●	not tested
	LF-7010/Panasonic	5.25/1GB	P	○	$4070	switchable	12	●	not tested
	LF-5010/Panasonic	5.25/1GB	P	○	$3370	switchable	12	●	not tested
	LF-9000/Panasonic	3.5/128MB	MO	○	$4240	switchable	12	●	not tested

● = yes; ○ = no. [1] M = multifunction; MO = magneto-optical; P = phase-change. [2] Price includes cartridge. [3] A subsidiary of Microtek Lab. [4] Drives from this company require Mac interface sold by third parties.

Company	Product/Mechanism	Size (in inches)/ Capacity	Technology [5]	Tested	Price [6]	Termination	Warranty (in months)	Toll-Free Support	Support Score
PCPC	OptiStream 128/MOST	3.5/128MB	MO	○	$1499	external	12	○	not tested
	WORE/Pioneer	5.25/650MB	M, MO	○	$3999	external	12	○	not tested
Pinnacle Micro	PMO-650/Pinnacle	5.25/650MB	MO	●	$4194	external	12	●	satisfactory
	REO-130S/Sony	3.5/128MB	MO	●	$2074	external	12	●	satisfactory
Plasmon Data Systems	RF-7010/Matsushita	5.25/1GB	M (w/phase change erasable)	●	$4245	switchable	12	●	good
	RF-3010/Matsushita	3.5/128MB	MO	○	$2195	switchable	12	●	good
PLI	Infinity Optical 3.5"/Sony or Epson	3.5/128MB	MO	●	$1999(S); $1899(E)	switchable	12 (S); 24 (E)	●	very good
	Infinity Optical 5.25"/Sony	5.25/650MB	MO	●	$3999	switchable	12	●	very good
	Infinity Max Optical/MaxOptix	5.25/1GB	MO	●	$4599	switchable	12	●	very good
Procom Technology	MEOD128/MaxOptix	3.5/128MB	MO	●	$1995	external	12	●	good
	MEOD650/MaxOptix	5.25/650MB	MO	●	$3995	external	12	●	good
Relax Technology	Erasable Optical Vista E-I/Ricoh	5.25/650MB	MO	●	$1499	external	12	○	poor
	Erasable Optical Vista HyperSpace/Ricoh	5.25/650MB	MO	●	$2799	external	12	○	poor
	128MB Optical Sierra/Ricoh	3.5/128MB	MO	●	$1299	external	12	○	poor
	Erasable Optical Vista 750/Optimem	5.25/650MB	MO	○	$1799	external	12	○	poor
	Pioneer Multi-Function Vista/Pioneer	5.25/650MB per side	M	●	$3188	external	12	○	poor
Rodime Systems	Condor 130e/Ricoh	3.5/128MB	MO	●	$2199	external	24	○	poor
	Condor 650e/Ricoh	5.25/650MB	MO	●	$4679	external	24	○	poor
Sony	RMO-S350/Sony	3.5/128MB	MO	●	$2295	external	15	○	dealer support only [7]
Storage Dimensions	MCO1-1000I/M - Tahiti II	5.25/650MB–1GB	MO	●	$5855 [8]	external	12	○	poor
	MCEI-650/Sony	5.25/650MB	MO	●	$4630 [8]	external	12	○	poor
TASS Optical World	PL128/Matsushita	3.5/128MB	MO	●	$1448	switchable	12	○	good
	SY650/Sony	5.25/650MB	MO	○	$3115	switchable	12	○	good
	MII 1000/Maxtor	5.25/1GB	MO	○	$4265	switchable	12	○	good
	PA 1000/Panasonic	5.25/1GB	M, P	○	$3165	switchable	12	○	good
Tecmar	LaserVault/Sony	5.25/650MB	MO	○	$6290	switchable	24	●	not tested
Third Wave Computing	OptiDisk 128/Sony or MOST	3.5/128MB	MO	○	$1299 (MO); $1599 (S)	external	12	●	satisfactory
	OptiDisk 600/Sony	5.25/650MB	MO	●	$2695	external	12	●	satisfactory
	OptiDisk 1000/MaxOptix	5.25/1GB	MO	○	$3695	external	12	●	satisfactory
Tulin Technology	A-Hive Jr. MO-120/Ricoh	3.5/128MB	MO	●	$1299	external	12	○	not tested
UnBound	OptiStor-S/Sony	5.25/650MB	MO	○	$4270	external	12	out of state only	satisfactory
	OptiStor-HS/Ricoh	5.25/650MB	MO	●	$4870	external	12	out of state only	satisfactory
XYXIS Corporation	XY128 RW/Ricoh	3.5/128MB	MO	○	$2070 [9]	external	12	○	not tested
	XY600RW/Ricoh	5.25/650MB	MO	○	$5220 [9]	external	12	○	not tested
	XY600RW/Ricoh	5.25/650MB	MO	○	$4475 [9]	external	12	○	not tested

● = yes; ○ = no. [5] M = multifunction; MO = magneto-optical; P = phase-change. [6] Price includes cartridge. [7] Company provides backup support only, but number is not listed in manual. [8] Price without Retrospect is $170 less. [9] Includes required interface kit.

nacle's PMO-650 and REO-130S; TASS Optical World's PL128; and MicroNet's MO-128 and SB-TMO-1000.

Technical Difficulties

WE RAN INTO OTHER INITIALIZING AND setup snags here and there in our testing. For example, the formatting software that comes with the TASS PL128 failed to format the disk at first—success came on the charmed third try. And the speedy Pinnacle PMO-650 shows some difficulties in *firmware*—instructions in the drives' read-only memory (ROM) chips. The drive suffers from periodic reset problems, freezing either the drive or the Mac when you start up both devices at the same time. We also had to return the original test unit because a disk became jammed in the mechanism. These problems will probably be worked out by the time you read this—Pinnacle updated its firmware twice during the period of our review alone.

On Speaking Terms

ANOTHER KEY CONCERN IS COMPATIBILITY across drives. Unlike removable cartridges, which can be used only with mechanisms of their own kind (a Bernoulli box will read only Bernoulli cartridges, for example), optical cartridges enjoy some compatibility across mechanisms.

But there are limits to this convenience. Consider this scenario. You store your company's tax data using a state-of-the-art optical drive in 1992. In 1997, you're audited by the IRS. But your optical drive has long since broken down, and its vendor is out of business. You try three other vendors' drives, but they can't read your cartridge—so much for 10-year guarantees on media.

Among five representative 3½-inch drives, only the MicroNet drive experienced problems—it could write to a cartridge formatted on any drive except the Pinnacle REO-130S. All drives tested could read and write to cartridges formatted on the MicroNet drive, however. MicroNet attributes the problems to incompatibilities in driver software. Among 5¼-inch units, there were considerably more problems. MO and Panasonic phase-change units are incompatible; similarly, media formatted by the Relax Pioneer Multi-Function Vista and a MaxOptix Tahiti II–based drive (tested in

1GB mode) couldn't be read by any other drive. With the exception of the Optima Concord 600S, every standard 5¼-inch MO unit we tested suffered from both read and write incompatibilities with one or more of five equivalent drives we tested. The lesson is clear: If your company is buying a number of drives, make sure they're all the same make and model. Play it safe; if you plan to use your cartridges outside your home or company, go for an MO drive and 650MB cartridges to minimize compatibility headaches.

Defeating Dust

FOR A DEVICE THAT WILL PRIMARILY BE used for archiving, reliability may be the most important buying consideration. A primary factor in data reliability for any removable medium is dust control. Pinnacle's PMO-650, the Ricoh HyperSpace–based Relax Erasable Optical Vista HyperSpace, the UnBound OptiStor, and the Rodime Condor 650e are the best at avoiding dust—the only drives we tested that fully enclose the media during operation. Those drives also separate the read-write functions from their electronic circuitry, drawing cooling air through the electronics only, bypassing the sensitive disk-platter area. Both measures greatly reduce the potential for dust to enter the cartridge.

Who's on Top?

IN GENERAL, DRIVES BASED ON THE 3½-inch form factor were faster than their 5¼-inch counterparts. The reason: a simple physical advantage of less ground to cover on reads and writes. Moving the heavy optical head takes time, and the shorter the distance, the less time required. Still, the two fastest drives were 5¼-inch units because the manufacturers introduced innovations such as split-head optics in the larger size first.

The top pick for the 5¼-inch category is the $4194 Pinnacle PMO-650, whose superb performance compensates for its mediocre technical support, irregularities in mounting, and firmware problems (see "Optical Performance Tests"). PLI's Tahiti II–based Infinity Max Optical is second—in performance and as a total package. At $4599, the drive isn't cheap, but the price is reasonable for cutting-edge technology. PLI offers the 1GB or 650MB format options and has some of the best technical support we found.

(To judge technical support, *Macworld* made three calls to each vendor, asking about typical problems for users of optical drives. The responses were rated for courtesy and technical knowledge, as well as for how easy it was to get through on the tech-support line. An average rating—between satisfactory and excellent—was then calculated for each company.)

If you're on a tight budget, consider Relax's two drives. The Erasable Optical Vista HyperSpace is one of the fastest in its category, and at $2799, one of the least expensive. Its older sibling, the Erasable Optical Vista E-I (based on an older Ricoh mechanism), costs only $1499—less than several of the 3½-inch drives. But if you're not overly concerned with money, beware—Relax drives have little else to recommend them. The older model finished dead last in our benchmarks—about half the speed of the fastest drive. If you're buying optical for overnight backup, you may not care, but beware of the nonadjustable verify-off setting. And don't plan on getting much help with these budget drives. We had trouble getting Relax tech support to return calls, and when we did get through, the attendant was woefully uneducated about optical technology. And both Relax units are loud enough to be irritating in an office—hardly conducive to a relaxing work environment.

At all costs, avoid the Storage Dimensions MCO1-1000 NR. Although this is one of the fastest 5¼-inch units we tested, its high price ($5855) and noisy operation make it a poor investment.

The choice among 3½-inch drives is easy. For speed, seven drives based on the MOST optical drive mechanism finished in a pack ahead of drives with any other mechanism. Among those, the MacProducts Magic 128 REM/MO and MacDirect NuDesign Optical are terrific, and comparable bargains. The Magic 128 has the most appealing price—$1199, compared with the NuDesign Optical's $1298. Both had very good tech-support ratings, unlike most of their competitors, but the Magic 128 had a marginally slower test score. Both are bundled with FWB's excellent Hard Disk Tool Kit Lite. (As we go to press, FWB began to phase out that product in favor of a new, improved package, Hard Disk Tool Kit Personal Edition.)

I would steer clear of two overpriced entries—Core International's $2320, IBM-based RM 128 was the slowest 3½-inch drive we tested, and Generation Systems' 128MB Optical, though based on a fast MOST mechanism, sells for a ridiculously high $2595.

What's Next?

IT WILL TAKE SOME NEW IDEAS, SUCH as those now being developed by some industry giants—to push optical performance to the next plateau. Fujitsu already sells in Japan a two-head, one-pass system for optical jukeboxes. The system uses three laser beams—for read, write, and verify—and operates at a 5400-rpm spindle speed. Fujitsu claims the unit achieves 2MB-per-second sustained data-transfer rates. Fujistsu has no plans to introduce the technology in the United States, however.

In the near term, performance gains will come from better implementation of the kinds of innovations that make the Pinnacle PMO-650 faster than other optical drives. When more vendors apply split-head optics, bigger caches with more-efficient algorithms, and fast coprocessors to the 3½-inch drive, along with the 3600-rpm spindle speeds already implemented by Epson mechanisms, the inherent advantages of the smaller form factor should yield performance comparable to that of today's midrange hard drives. This improvement should take place by the summer of 1993.

And the International Standards Organization (ISO) will soon update the capacity standards for optical drives, if it hasn't done so by the time you read this. The new standard will decrease spot size or track width to increase disk capacities by a factor of two or three—for the 5¼-inch form factor, this would create capacities of 1.3GB or 1.95GB. Also, by the time you read this, 3½-inch drives using a new MOST mechanism that offers a 256MB capacity will be available. The larger-format drives will make data management easier for voracious users of disk space.

Does all this mean optical drives will finally be a sensible option for primary storage? Perhaps. But unless hard drive manufacturers have gone to sleep, they'll be doing everything they can to stay a step ahead of the optical competition. **m**

See *Where to Buy* for contact information.

Macworld Lab testing supervised by TIM WARNER.

MW EDITORS' CHOICE

5¼-inch Drives

PMO-650 This drive's speed is a significant advance for optical technology, and its full enclosure of the media cartridge reduces data-damaging dust contamination. **Company:** Pinnacle. **List price:** $4198.

3½-inch Drives

NuDesign Fast, inexpensive, good technical support, easy to use—this is a rare combination of qualities for a storage device. **Company:** MacDirect. **List price:** $1298.

Magic 128 REM/MO This is the cheapest, and one of the fastest optical drives we tested, with excellent technical support to boot. **Company:** MacProducts USA. **List price:** $1199.

For data on the move, Macworld Lab found SyQuest cartridge drives to be the best solution overall. SyQuest drives are available from many companies, including Liberty Systems (top). Competing cartridge technologies include Ricoh (middle, in a GCC Technologies drive) and Bernoulli (bottom, in an Iomega drive).

REMOVABLE

Storage

MACWORLD LAB TESTS 52 PRODUCTS THAT OFFER LIMITLESS STORAGE

Do you need to move large amounts of data between Macs without tying down a network or using stacks of floppies? Are you looking for a convenient archival medium? Do you want to take QuickTime movies or other sophisticated business presentations on the road? For all these needs and more, removable-media drives—like SyQuests, Bernoullis, and super-dense floppies—offer essentially unlimited storage flexibility for anyone with a limited budget and modest amounts of data (between 20MB and 90MB). (Another form of removable media, optical disks, are covered in "Optical Update," in this issue.)

BY MATTHEW LEEDS

And removable hard drives appeal to those users with bigger budgets who need to move around a lot of data, with some models providing up to 1.2GB—that's 1200MB—of storage. Unlike fixed hard drives, removable-media drives let users remove both the recording media and the drive mechanism as one cartridge. Because they are hard drives, removable drives can store a lot of data.

Despite the variety of types of removable media, there is little variety within each type. Except for the removable hard drives, the mechanisms come from a select group of manufacturers: SyQuest Technology, Ricoh Corporation, Iomega Corporation (which makes the Bernoulli mechanisms), Brier Technology (which makes the Flextra mechanisms), and Insite Peripherals (which makes the Floptical mechanisms).

With only one manufacturer of each type of mechanism, you might expect vendors to differentiate their products by offering additional features, but they haven't. In fact, this year's crop of drives shows that the field has taken on the semblance of a commodities market, with many players selling similar products. While the market's not quite yet like pork bellies and orange juice, you will need to look beyond performance benchmarks to make your own selections. Macworld Lab tests show that all products using a particular mechanism are basically alike, so choose a technology first and then a product based on price and support.

Why a Removable?

THERE ARE MANY REASONS TO CHOOSE a removable-media drive over a hard drive. A hard drive has a fixed storage capacity. Once it's full, that's it. With a removable-media drive you just pop a full cartridge out and pop an empty one in. And the cartridges are big enough that you can use one for backup, without the hassle of swapping stacks of floppies or waiting for a tape drive to finish saving. Depending on the cost and storage capacity of the removable drive's media, this may or may not be a cost-effective backup method, but given that all of the drives we examined move data faster than a floppy drive does, it certainly is speedier than backing up to floppies. Removable-media drives also provide random access to data, something a tape drive cannot do; and depending on the backup method you use, you may be able to access the data directly from the cartridge without bothering to restore it to a hard drive. Try that with a tape drive.

Removable media are also extremely useful for transporting large files. The cartridges are much smaller and lighter than an external hard drive, and generally more durable. Desktop publishing service bureaus have discovered this, and most accept files stored on at least one type of removable cartridge. Cartridges can also be used for distributing data within an organization and generally are cost-effective as long as the organization keeps reusing

PHOTOGRAPHS BY WILLIAM ZEMANEK

the media. In some cases, depending on the cost of the data being distributed, cartridges may be appropriate for commercial distribution of data.

Removable-media drives are uniquely suited for data security. At the end of the day you can remove a cartridge from a drive and store it in a secure area, say a locked file cabinet. This is a much more effective method of safeguarding data than are software passcodes and locked floppy drive ports, since even if the entire computer is stolen, the data remains. Locking up the removable media also avoids the use of data encryption and the possible loss of the decryption key, as well as problems that proprietary formatting applications can create when you need to use data-recovery tools to get data from a drive that has failed.

Removable-media drives are also useful for archiving data, since the removable media are generally more stable in the long term than tape is. (Tape can stretch, break, and in long-term storage it sometimes suffers from *print-through*, where the magnetic signal that encodes your data crosses successive layers of tape and garbles data.) And data access from a removable drive is faster than from a tape drive.

Most removables can be used as a second hard drive. In many cases their performance is close to that of a fixed hard drive. Plus a removable can usually be used as a start-up drive.

Removable-media drives also offer users the option of creating unique environments on each cartridge, such as different versions of the System or different sets of applications.

With all removable-media drives, you must follow the correct eject procedure, or you risk damaging the drive and the data on the cartridge—removing a cartridge is not the same as ejecting a floppy disk. Removable disks or cartridges must spin down and the drive's read-write heads must retract before you remove the medium. If you're impatient and remove the medium prematurely, an engaged read-write head might drag across the medium and scratch it or scramble the information on it.

All the drives reviewed here contain a mechanism from one of only six manufacturers. Each manufacturer uses different technology to produce its drives and takes a different approach to delivering the mix of features that make up a removable-media drive.

A Buyer's Checklist

Because, as the Macworld Lab tests show, drive performance is so similar within mechanism types, what criteria should you use to select a specific vendor for the technology you decide to buy? Use this checklist to narrow down your choices.

- How much data do you need to store on a single cartridge? If it's more than 100MB, you've got only one choice: a removable hard drive.
- If you need to exchange data with others, what drives are they using?
- If you plan to use a drive for backup or archiving, you can chart the cost curve for the drive plus the media you'll be using. Pick the most cost-effective, but also factor in the time you'll need to spend swapping cartridges if you must use a lot of cartridges.
- If you're looking at a recently released technology, remember that market acceptance often drives prices down over time, an important factor if you are planning a corporate standard or if you expect to purchase a lot of blank media over time. Look to see how many vendors offer a specific technology.
- If you plan to travel abroad with the drive, you will need a universal power supply in your drive.
- If you plan to use the drive on a variety of Macs, make sure that the SCSI termination is either external or switchable.
- Do you plan on stacking a Mac on top of the drive to save desk space? If so, you may want to look for a drive with a metal case and a zero-footprint design.
- Are you sensitive to noise? Check out the results of our sound testing to select a quiet drive.
- Price is always an issue, and you should note that not only does the price of the drive vary from vendor to vendor, but the cost of blank media varies as well. Keep in mind that, like floppy disks, blank media are all alike; so shop around for cartridges. Your dealer's prices may be higher than a local office-supply store. "Rating Removable Drives' Performance" shows typical prices.
- If you're buying a drive for home use, check the drive's FCC class rating. Only drives with a Class B rating can be sold for home use; a label should appear on the drive case saying it's a Class B device. (Non–Class B drives may interfere with radio, television, or other consumer electronic devices, as well as police scanners and other radio-based devices.)
- Narrow down your choice by evaluating vendors' technical support. Check our ratings in "Comparing Removable Media."

SyQuest: Widely Available, Reliable

PERHAPS THE BEST KNOWN, SYQUEST drives are half-height 5¼-inch devices with cartridge capacities of either 44MB or 88MB. (A new 105MB version is expected to ship this fall.) The drives consist of a mechanism to receive a data cartridge, a motor to spin the disk inside the cartridge, a pair of read-write heads, and control electronics that include a SCSI interface. The cartridge contains a single metal disk with a magnetic coating in a plastic shell, with a spring-loaded shutter that opens to give the read-write heads access to the disk.

When you insert the cartridge into the drive, the drive motor engages the disk and starts it spinning. Contamination from dust and other particles that may have settled on the disk surface is eliminated by a combination of centrifugal force (the drive spins at 3220 revolutions per minute) and air pressure (12,000 pounds per square inch) between the heads and the disk surface. Once this purge cycle is completed, the read-write heads settle down to read-write height, at which they skim over the SyQuest cartridge below.

Much of the technology used in SyQuest drives is derived from the hard drive industry. This allows for a low manufacturing cost and the rapid integration of new hard drive technology into SyQuest products.

Drives based on the SyQuest mechanism have had strong acceptance in the market, evidenced by the large number of companies offering products based on SyQuest mechanisms and the large installed base in service bureaus. There had been a considerable number of reports of problems with older 44MB SyQuest drives, ranging from easily damaged drive heads to incompatibility with other SCSI devices and problems with different formatting software. For example, if you mounted a disk formatted with Brand A software, dismounted it, and then mounted a disk formatted with Brand B software, the Brand A driver would still be in memory and would be used for the Brand B disk. This frequently corrupted the data on the Brand B disk.

But this problem should not occur with modern drives. Version 3.4 of the

Removable hard drives offer access to a large amount of data while keeping that data transportable or securable. The ETC Peripherals DataPort Twin (left) includes a SyQuest drive as well as a 210MB removable hard drive. Both La Cie's Express (top) and Mega Drive Systems' Mercury products can handle a range of drive capacities, with the Express supporting up to 240MB and the Mercury up to 1.2GB.

SCSI Probe utility (written by Robert Polic) automatically unloads the current driver from memory, ensuring that the correct driver is loaded from the disk that has just been mounted. SCSI Probe has been licensed by SyQuest and is available free on several electronic bulletin boards or directly from SyQuest. SyQuest has also offered it to vendors free with its SyQuest drives. In fact, our testing this year uncovered no instances of this problem. And an informal survey of dealers and volume buyers showed that SyQuest reliability concerns in general have disappeared.

But we did see a disadvantage in using 44MB (the 555 Series) SyQuest cartridges on some 88MB (the 5110 Series) drives: the 88MB drives can read from, but not write to, the 44MB cartridges.

If you use a 44MB cartridge on a Mac running System 6 and then insert that cartridge into an 88MB drive connected to a Mac running System 7, the 88MB drive cannot mount the cartridge. System 7 needs to rewrite the invisible desktop files before mounting the cartridge, and since the 88MB drive cannot write to the 44MB cartridge, you're stuck.

We also noticed a significant performance difference—about 10 percent—between 88MB drives with two different ROMs installed, versions BBA and CFA. The new CFA version of the SyQuest 88MB mechanism uses a look-ahead caching algorithm that reads more information than needed by the current Mac operation and stores this extra information in a buffer in case it is needed for the next operation (which is often the case). The new CFA ROM has been in all 88MB drives SyQuest has shipped since January, although some dealers may still be selling older stocks with the BBA ROM. We received drives with the discontinued BBA ROMs from APS, FWB, Generation Systems, HDI, Mac Direct, Prima Storage Solutions, and Rodime.

SyQuest does not offer an upgrade option, nor do dealers, so make sure you check the ROM version before you buy. You can check the ROM version with SCSI Probe. (If performance is an issue, make certain that you get the latest version of the ROM in any drive you purchase, no matter the type.)

Although a SyQuest mechanism is a SyQuest mechanism no matter who sells it, we did have difficulty with the Rodime Systems drives, caused by their different eject mechanism. Unlike with all the other SyQuest-based systems we tested, you must first press the eject button on the Rodime drive, then drag the drive icon to the Trash Can to dismount the cartridge. This is the reverse of the procedure that all other removables use. (The manual does document this difference, but the procedure will nonetheless confuse users experienced with other SyQuest drives.)

We also ran into a difficulty with the CMS Enhancements 88MB drive. We found that the drive cycles its power (the power goes off, then back on) during a restart of the Mac. This makes it hard to use the CMS drive as a start-up device. The CMS technical-support department made several suggestions, the last of which worked but involved opening the Mac to change the SCSI ID of the internal hard drive, not something the average user will want to do.

This fall, SyQuest will offer the next generation of SyQuest mechanisms, which promises to change the SyQuest market considerably. The Iota series will be a 2½-inch, 42MB mechanism with programmable power-management firmware that makes it attractive for use in notebook computers. It has a 32K look-ahead buffer like the current 88MB desktop SyQuest mechanism's, sleep and standby modes, quick return from sleep mode, and good data-transfer performance. The Mesa series will be a 3½-inch, 105MB mechanism with similar power-management firmware, a 64K look-ahead buffer, and good data-transfer performance. The Mesa drive may be available in the Mac market by the time you read this article.

Ricoh: Designed for Reliability

A RICOH DRIVE IS SIMILAR IN SOME respects to SyQuest drives. It too is a half-height 5¼-inch device with a cartridge. The drives also contain similar components (a mechanism to receive a data cartridge, a motor to spin the disk inside the cartridge, a pair of read-write heads, and control electronics that include a SCSI interface), but there the comparison ends. Ricoh drives come in just one storage capacity: 50MB. And Ricoh has built in several features to enhance the integrity of data stored on its cartridges. Some of these features are built into the drive and some are contained in the cartridge.

For example, the drive read-write heads retract inside the drive mechanism until a cartridge is inserted in the drive. You cannot eject a cartridge while the drive is still spinning, as you can on the 44MB SyQuest drives. The drive contains three electrostatic filters to remove particles (like dust) from the drive environment. The cartridges also contain filters and have seals at each open point to prevent outside air from entering the cartridge. When not inserted in a drive, the disk in the cartridge is clamped in place by two springs. All of these features were designed to enhance the reliability of both the cartridge and drive, and thus the integrity of the data.

Despite being designed for greater reliability and having a greater storage capacity than the 44MB SyQuest drives, Ricoh-based drives are not stocked by most dealers, and only a single vendor

Floptical drives, like these from Digital Micronics (top) and PLI, offer the advantage of high-capacity storage while also being able to read standard Mac floppy disks.

loaned us a Ricoh-based drive for testing. As you can see from the mechanisms section of "Rating Removable Drives' Performance," Ricoh's performance is not up to that of SyQuest or Iomega drives.

Bernoulli: Crash-Resistant and Fast

THE MECHANISMS FROM IOMEGA ARE based on an effect named after Swiss physicist Daniel Bernoulli, which is why they were named Bernoulli drives. This effect causes the read-write head to float over the surface of the magnetic disk in the cartridge. The disk itself is very similar to the flexible disk inside a floppy and much different from the rigid metal disks in SyQuest and Ricoh drives. This design makes Bernoulli drives essentially immune to head crashes, and the medium is much more resistant to damage when dropped. (Head crashes are usually caused by a drive's being bumped while operating; the read-write head then bumps the surface of the spinning medium. This can damage the magnetic coating of the medium or the read-write head, or both.) A Bernoulli drive contains the usual motor, read-write heads, and SCSI interface.

Today's Bernoulli drives (and cartridges) have a 90MB capacity. (Older drives had a 44MB capacity; the 90MB drives can read these 44MB cartridges but can't write to them.) Of all the drives we tested, the Bernoulli drives' performance comes closest to that of a standard hard drive. But Bernoulli media wear out faster than hard drives, because Bernoullis are flexible. And they are still more expensive than SyQuest drives and have not been as popular in service bureaus. Bernoullis were also among the noisiest of the drives we tested.

Flextra and Floptical: Super Floppies

WHILE THE SYQUEST, RICOH, AND BERnoulli drives all derive a portion of their technology from the hard drive arena, two companies have approached the market from another angle, adapting floppy drive technology while increasing data-storage capacity. Both types of adapted floppies, Flextras and Flopticals, are based on a 4MB floppy disk developed by Toshiba.

The 4MB Toshiba disks use a new recording medium that allows a denser recording of data than traditional disks do. The new extra-high-density drives developed for these disks can also read and write standard-density and high-density disks, so theoretically you could use a 4MB Toshiba floppy drive for your standard 800K and 1.4MB Macintosh floppy disks—except that no one has yet announced a Macintosh version of the Toshiba 4MB floppy disk and drive.

But two companies did take a look at the new recording medium developed for the 4MB floppy and decided that it could hold quite a bit more data if only some way of writing narrow tracks could be developed. The results were the 25MB Flextra technology developed by Brier and the 21MB Floptical technology developed by Insite.

The Flextra mechanisms use a special high-density version of standard floppy magnetic encoding technology. The data is stored at one magnetic frequency, and the read-head positioning information that keeps the head on track is stored at another frequency. These two signals are superimposed, allowing much more data to be stored on the medium. Flextras have been shipping for over two years, but the only vendor in the Macintosh market is Quadram.

We had several problems with the units Quadram sent to us. The first unit was defective, so Quadram sent a replacement; but until we removed Apple's System 7 TuneUp 1.1.1 from the System Folder, the replacement also refused to function correctly. It was also one of the noisiest units we tested.

Floptical mechanisms use a combination of optical and magnetic technologies

Don't Abuse Your Media

Regardless of which product you choose, there are some important items to keep in mind. Any of these devices can store a lot of data—*valuable* data. Proper care of the media can ensure that you'll get the maximum life span out of them.

- Always follow the vendor's instructions for dismounting and ejecting media before shutting down the Mac. This will avoid the most common cause of data loss with removable-media drives.
- Store your media properly. This means keeping cartridges clean and keeping them away from dust, dirt, and other contaminants. Removable media are more sensitive to environmental contamination than floppy disks, because their data is stored more densely. Don't use pencils to write on removable-media labels; the graphite dust can trash a drive's heads as fast as sandpaper.
- Keep removable media out of temperature extremes like your car's glove compartment or trunk. Roast eggplant, not data. For those of you in northern climates, if you travel with removable media in winter, let the cartridges come back to room temperature before you insert them in a drive; otherwise, condensation can end up on your drive's read-write heads and damage them.

(For tips on using removable media, see *Getting Started, Macworld,* February 1992.)

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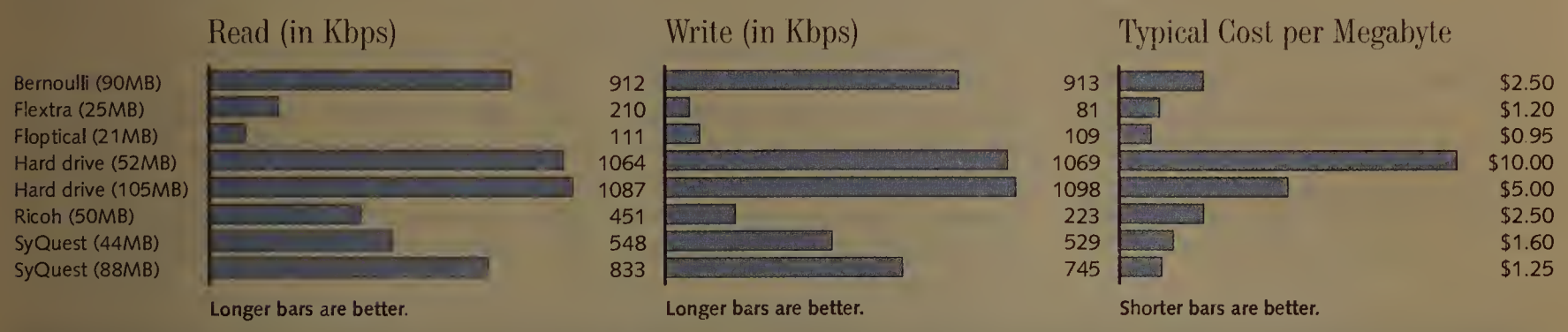
MW LAB Rating Removable Drives' Performance

Different classes of removable drives show strong differences in data-transfer speed, as these averages for all products tested in each class show. We used SCSI Evaluator to measure transfer rates.



Within each class of drive, we found few differences, since all drives within a class use mechanisms from the same manufacturer. For real-world tests, we measured each drive's ability to duplicate a 3.2MB file and a 10MB folder and to search a database for a specific record. We also averaged the drives' speeds for opening and saving from several applications, including PageMaker and Photoshop. For noise, readings of 35 decibels (dB) are audible; at decibel levels in the upper 40s, the noise becomes annoying.

Shorter bars are better.	Duplicate (in seconds)	Open (in seconds)	Save (in seconds)	Search (in seconds)	Noise (in dB)
Bernoulli					
Iomega MacTransportable 90 Pro	55.5	64.9	73.0	39.3	47.7
Liberty Systems 115 series 90MB Bernoulli	57.1	66.3	83.3	40.3	47.3
Removable Hard Drive					
ETC 210MB Removable HD	37.1	50.4	50.0	36.9	42.2
La Cie Express 105MB	43.2	56.9	56.3	35.6	34.6
La Cie Express 50MB	46.3	58.6	60.9	36.1	34.7
Quantum Passport XL 105MB HD	43.8	57.3	56.6	35.7	34.6
Quantum Passport XL 50MB HD	46.2	58.6	60.6	36.0	34.7
Ricoh					
GCC Technologies 50R	96.9	95.1	122.8	64.4	41.1
SyQuest 88MB					
APS SyQuest 88	55.7	72.4	72.1	51.1	42.2
CMS Enhancements PD88 Removable	50.4	62.7	67.3	40.9	44.6
ETC Peripherals Data Drive 88R	49.7	61.3	67.8	41.3	44.3
FWB HammerDisk 88	56.0	72.7	70.8	50.9	43.2
Generation Systems 88MB Removable	55.1	72.1	70.6	50.2	46.9
Hard Drives International PowerDrive	54.6	72.3	71.8	50.7	44.1
Liberty Systems 115 Series SyQuest	49.6	60.1	65.7	41.6	44.3
Loviél Removable	50.2	60.9	67.0	41.1	46.8
Mac Direct SyQuest	54.9	72.1	70.7	50.5	42.3
MacLand Removable	50.6	61.4	66.9	41.9	44.4
Mass Microsystems Datapak	50.1	60.6	68.1	39.9	48.0
Mirror 88MB Removable	49.4	60.7	67.6	40.9	44.7
Optima DisKovery 88R	50.3	61.1	66.1	41.1	45.9
PLI Infinity 88	49.5	61.0	67.2	40.5	42.8
Prima Storage Solutions PDQ	50.4	65.5	107.2	50.7	45.5
Relax Technology Mobile Vista	49.5	61.2	66.8	40.9	44.8
Rodime R90 Plus	55.5	72.8	70.6	50.2	44.8
Third Wave Computing 88R	49.7	60.2	65.4	40.8	42.5
Total Peripherals TP-Removable	57.5	65.2	73.1	42.2	49.4
SyQuest 44MB					
FWB HammerDisk 44	64.4	79.9	81.3	52.3	41.0
Generations Systems 45MB Removable	58.5	71.5	118.0	52.0	46.2
Hard Drives International PowerDrive	67.9	81.5	85.0	51.9	44.3
Loviél Removable	63.4	79.2	82.4	52.8	45.5
MacDirect SyQuest	63.9	79.4	82.6	52.4	43.1
MacLand Removable	64.2	79.7	83.0	53.4	42.9
MacTel Index Elite 45R	64.0	80.5	83.4	52.6	38.7
Mass Microsystems Datapak	63.8	79.6	82.5	51.7	42.7
Mirror 45MB Removable	63.5	79.7	81.9	52.6	44.0
Optima DisKovery 45R	63.7	80.0	81.6	52.5	43.8
PLI Infinity 40	64.0	79.5	83.7	52.3	38.9
Prima Storage Solutions PDQ	63.1	79.7	83.3	52.7	43.3
Relax Technology Mobile Vista	63.7	79.0	82.9	52.6	44.1
Rodime R45 Plus	63.5	79.4	82.4	52.6	43.7
Third Wave Computing 45R	63.3	80.0	82.8	51.9	42.5
Total Peripherals TP-Removable	63.9	81.3	85.9	53.9	44.3
Flextra					
Quadram QuadFlextra 25	270.4	313.5	483.9	101.6	46.6
Floptical					
Digital Micronics Floptical	248.4	229.1	358.7	174.0	45.0
Mass Microsystems FloptiPak 21	245.6	232.7	362.8	172.2	*
PLI Infinity Floptical 21MB	244.8	227.0	377.2	125.2	*
Procom Floptika 20/M	228.6	220.7	533.5	174.7	32.7
Rancho Technology RT5000 Mac	245.6	231.8	361.7	172.0	43.1
Second Wave ViperDrive	249.9	231.4	362.9	172.8	*
TASS Optical World EFL20	245.3	232.2	366.0	172.3	37.2
Tulin A-Hive Jr.	247.1	233.5	366.6	171.7	*

* Drive noise was less than background noise.

yet can read standard magnetic floppy disks as well as the magneto-optical Floptical disks. In this approach, data is stored magnetically, while the read-head positioning information is imprinted at the factory as optical "guides." As with Flextras, this division of data and positioning information into independent, parallel pieces allows much denser storage than does the traditional magnetic-only approach used in standard floppies.

Several of the Floptical-based units had no fans installed in their cases; this made them the quietest units we tested. Even the two with fans—the Procom Technology and TASS Optical World units—were very quiet. Because the Floptical drive is based on a floppy mechanism, it uses much less power than a hard drive and generates less heat. Leaving out a fan cuts the noise and eliminates one potential source of pollution: dust sucked into the drive by a fan. But adding a fan may lengthen the life of the drive and its power supply by reducing wear and tear due to heat.

The two Flopticals shipped to us by Rancho Technology could not be used as the start-up device. We worked with the technical-support department to troubleshoot the problem and eventually found a disconnected SCSI ID selector switch in both drives. Reconnecting the selector

COMPARING REMOVABLE MEDIA

Company	Tested by Macworld Lab	Product Line	Capacity/ List Price	Product Media	Password Protection	Free Support (in months)	Toll-free Support Call	Support Score
APS	●	APS SyQuest	88MB/$559	SyQuest	●	unlimited	●	good
CMS Enhancements	●	PD Removable	88MB/$1399	SyQuest	●	12	○	satisfactory
Digital Micronics	●	Floptical Disk Drive	21MB/$549	Floptical	●	unlimited	○	poor
DJK Development	○	MagOptic [1]	21MB/$599	Floptical	●	unlimited	○	good
ETC Peripherals	●	DataPort Twin	210MB/$1749	Removable hard drive	○	12	●	satisfactory
	●	DataDrive	44MB/$429; 88MB/$559	SyQuest	○	12	●	satisfactory
FWB	●	Hammer Disk	44MB/$869; 88MB/$1099	SyQuest	●	unlimited	○	good
GCC Technologies	●	UltraDrive	50MB/$1099	Ricoh	●	unlimited	●	good
Generation Systems	●	Removable Drive	44MB/$945; 88MB/$1295	SyQuest	●	unlimited	●	good
Hard Drives International	●	PowerDrive	44MB/$449; 88MB/$649	SyQuest	○	unlimited	●	good
Iomega	●	Bernoulli Transportable Pro	90MB/$713	Bernoulli	●	unlimited	●	satisfactory
La Cie	●	Express	52MB/$798; 105MB/$948; 120MB/$1198; 240MB/$1348	Removable hard drive	●	unlimited	●	good
Liberty Systems	●	115 Series Bernoulli	90MB/$999 [2]	Bernoulli	○	12	○	satisfactory
	●	115 Series SyQuest	44MB/$599; 88MB/$799 [2]	SyQuest	○	12	○	satisfactory
Loviél Computer	●	Removable	44MB/$799; 88MB/$999	SyQuest	●	none	○	satisfactory
MacDirect	●	Mac Direct	44MB/$448; 88MB/$628	SyQuest	●	unlimited	○	poor
MacLand	●	Removable	44MB/$399; 88MB/$499 [2]	SyQuest	○	12	●	satisfactory
MacTel Technology	●	Index Elite Removable	44MB/$539	SyQuest	○	unlimited	●	good
Mass Microsystems	●	Floptipak	21MB/$699	Floptical	○	unlimited	●	good
	●	Datapak	44MB/$899; 88MB/$1199	SyQuest	●	unlimited	●	good
Mega Drive Systems	○	Mercury External [3]	52MB/$898; 105MB/$993; 120MB/$1218; 240MB/$1391	Removable hard drive	●	unlimited	●	satisfactory
	○	Millennium External [3]	52MB/$1010; 105MB/$1105; 120MB/$1330; 240MB/$1543	Removable hard drive	●	unlimited	●	satisfactory
Mirror Technologies	●	Removable Drive	44MB/$449; 88MB/$549	SyQuest	●	unlimited	○	good
Optima Technology	●	Diskovery	44MB/$649; 88MB/$849	SyQuest	●	unlimited	○	good
PLI	●	Infinity Floptical	21MB/$599	Floptical	○	unlimited	●	very good
	●	Infinity	44MB/$899; 88MB/$999	SyQuest	○	unlimited	●	very good
Prima Storage Solutions	●	PDQ Removable	44MB/$795; 88MB/$995	SyQuest	○	12	●	poor
Procom Technology	●	Floptika	21MB/$585	Floptical	●	unlimited	●	satisfactory
	●	MRD	44MB/$805; 88MB/$985	SyQuest	●	unlimited	●	satisfactory
Quadram	●	QuadFlextra	25MB/$495	Flextra	●	12	○	satisfactory
Quantum	●	Passport XL	52MB/$918; 105MB/$1098; 120MB/$1368; 240MB/$1568	Removable hard drive	●	unlimited	○	good
Rancho Technology	●	RT5000 Mac	21MB/$533	Floptical	○	12	○	[4]
Relax Technology	●	Mobile Vista	44MB/$439; 88MB/$599	SyQuest	○	unlimited	○	satisfactory
Rodime Systems	●	Plus	44MB/$729; 88MB/$999	SyQuest	○	unlimited	○	poor
Second Wave	●	ViperDrive	21MB/$595	Floptical	○	unlimited	○	satisfactory
TASS Optical World	●	EFL20	21MB/$695 [2]	Floptical	●	12	○	poor
Third Wave Computing	●	R	44MB/$479; 88MB/$669 [2]	SyQuest	●	unlimited	●	satisfactory
Total Peripherals	●	TP-Removables	44MB/$599; 88MB/$829	SyQuest	○	unlimited	○	satisfactory
Tulin	●	A-Hive Jr	21MB/$459	Floptical	●	12	○	[4]

● = yes; ○ = no. [1] *Also offers hard drive/floptical combinations.* [2] *No media supplied with drive.* [3] *Other models available with additional drive slots, higher-capacity drives up to 1.2GB.* [4] *Could not evaluate support because caller could not remain anonymous.*

as well as for moving, rotating, resizing, and extruding text. (You can also use dialog boxes to specify precise rotation, extrusion, and resizing values.)

To create 3-D text, you type the text in a dialog box. A Font pop-up menu lets you choose a font; but check boxes for italics, bold, and other stylistic variants are missing. To use these styles, you must have separate fonts with these attributes installed in the System file. If a font lacks the stylistic variants you want to use, you have to create them using a font utility such as Altsys's Fontographer. StrataType 3d doesn't have this shortcoming.

When you're typing new text, you can also choose one of four bevel styles to give letters a rounded, routed, or sharp-edged appearance. You can also specify the size of the bevel. When you're done, click on a button, and in a few moments a wireframe (outline) version of the object appears in the document window (see "Text on a 3-D Stage").

Setting the Stage

AFTER YOU BUILD AN OBJECT, YOU CAN position it, assign textures to its surfaces, and adjust lighting. As in Pixar's Showplace, surfaces in Typestry are called *looks*. Typestry includes a selection of looks for common surfaces—shiny metal, stucco, bricks, wood, plastic. You can also add looks that are sold separately by Pixar and third-party developers such as The Valis Group (510/236-4124).

In the 3-D graphics world, you view objects from the vantage point of an electronic camera. Typestry lets you use one of several lenses: normal, fish-eye (exaggerates perspective), and zoom (flattens perspective). In this regard, Typestry is a bit less flexible than StrataType 3d, which provides one lens whose focal length is continuously variable.

But Typestry's lighting is light-years ahead of StrataType 3d's. StrataType 3d provides just one light source, while Typestry provides 18 of them: 9 front lights and 9 backlights. You can customize each light's intensity, color, and position, as well as assign electronic gels that cast shadows to simulate windowpanes, a spotlight, venetian blinds, and more. You can also specify that a light pointed at an object move along with the object. Combine this with Typestry's animation features, and you can create a spotlight that follows a moving object.

For creating animations (another capability StrataType 3d lacks), Typestry uses a simple keyframe scheme: move an object or a light, choose Next Keyframe, and then repeat the process. Typestry calculates the intermediate frames for you.

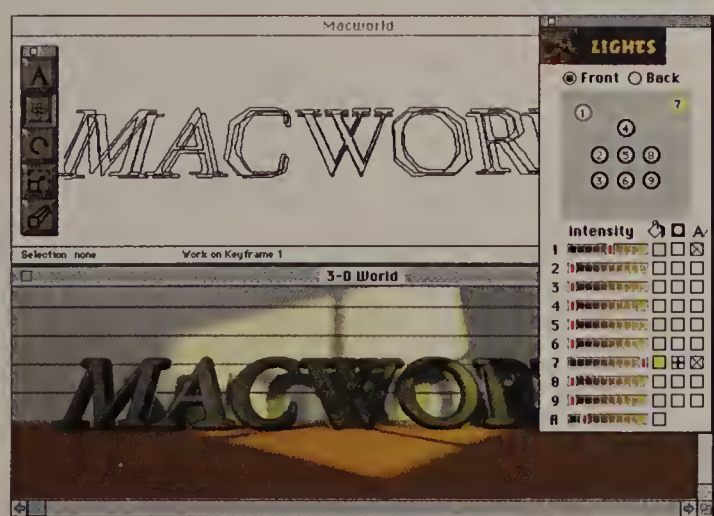
Rendering the Image

WHEN YOU'RE READY TO SEE YOUR image, you can choose from three rendering techniques, each of which provides a different degree of image quality. (Savvy 3-D users can also customize rendering settings.) Typestry contains an improved version of Pixar's MacRenderMan software that Pixar says is roughly 30 percent faster than the renderer that accompanies Showplace. Still, rendering is a complex process, and it's not unusual for a complex, high-quality image to take an hour to render on a Mac IIci–class machine. Typestry can render in the background, so if you have 10MB of memory or more, you can run other programs while you wait.

You can save a final image in PICT, EPS, or TIFF format. TIFF files can have an optional alpha channel—valuable if you plan to further modify the image in a program such as Adobe Photoshop.

There's still room for improvement in Typestry. You should be able to choose stylistic variants even if you don't have a screen font for them installed. Also, the program could offer the user more control over bevel shapes—StrataType 3d provides a window in which you can use Bézier controls to design your own bevels. StrataType 3d also provides a large library of canned text-positioning effects; Typestry doesn't. And although Typestry's unique, magazine-style manual is approachable and generously illustrated, it lacks a reference section listing keyboard commands, and its one-page index is inadequate.

But these minor shortcomings shouldn't deter you from taking your text into the third dimension—provided you have the hardware to get you there. Typestry is an exciting, reasonably priced tool for designers, multimedia producers, and anyone who enjoys working with type.—JIM HEID



Text on a 3-D Stage Typestry's object window (top) lets you move, resize, and rotate objects. The Lights palette at right graphically shows each light's position and intensity settings. The bottom window shows an image rendered in Typestry's highest-quality setting.

Mapping Software

Atlas Pro 1.0.6

PROS: Good use of System 7 features; very object-oriented; rich feature set; includes much useful data. **CONS:** Awkward arrangement of commands on menus; can't produce data-driven line maps; only numeric fields can be thematically mapped. **COMPANY:** Strategic Mapping (408/985-7400). **REQUIRES:** Mac Plus; 1MB of RAM (2MB for System 7); System 6.0.5. Recommended: 5MB of hard drive space. **LIST PRICE:** version 1.5 $795.

MW ★★★★

DESKTOP MAPPING PROGRAMS take advantage of the fact that about 75 percent of all databases have some kind of location information, such as zip codes or street addresses. A mapping program takes that information and draws a map with symbols positioned on it to represent the data, such as dots of various sizes to show the number of customers in different zip code areas.

The simplest desktop mapping programs—thematic mapmakers—only draw point or area maps from data you supply. If you want more capabilities, consider Atlas Pro, an entry-level geographic information system (GIS). Briefly, a GIS encodes, stores, retrieves, analyzes, and displays geographical data. Thematic map makers handle only the display aspect; for example, they can't perform analyses to join or split geographic areas or create new ones. Thematic maps are the end product; with a GIS, the map is only the beginning. Atlas Pro and similar products let you analyze data right from the map. For example, you can select all the data points within an area—such as all customers within a 100-mile radius of the site of a seminar you're planning.

Atlas Pro costs $300 more than its thematic-mapping predecessor, Atlas MapMaker (you can upgrade for $249), but it has more than half again as much functionality. Yet it isn't a full-featured GIS (in fact, Strategic Mapping never calls it a GIS). Some of its GIS tools are only basic; others are missing, such as buffer creation and polygon overlay. Atlas Pro doesn't excel at handling really big geog-

continues

raphy files. Nevertheless, it can locate street addresses, draw street maps showing street names, and display pictures or QuickTime movies attached to points or areas. You can select map features either directly on the map or with data queries, and then combine selected areas into territories or prepare lists and statistics from the data.

For many types of geographic analysis, Atlas Pro has all the necessary tools. The program can lay images behind the map features using SmartPICTs, PICT files that store real-world coordinates for their corners. This enables you to orient geography files correctly to a background image, say a scanned aerial photo. This feature could come in handy—for example, for quickly drawing detailed road maps and then adding specifics, like lodging in a certain price range or sites that children would enjoy visiting.

The program comes with 3.5MB of tutorial files and data for zip-code lookup, plus a 1.5MB set of reference files that include all zip codes. You also get 4.5MB of geographic coordinates and other information, including detailed and generalized boundaries for all the counties in the United States; U.S. states, cities, and interstate highways; Canadian provinces and cities; and world countries and cities. There are also files of general information such as population and demographic details about all the listed areas; the U.S. data comes from the *County and City Data Book, 1988*.

If you send in the registration form, Strategic Mapping sends you even more boundary files as a bonus. Additional street files, based on census data and converted to a proprietary format, cost $200 to $500 per county. Street files are also available from Atlas Pro's publisher for individual states as well as the whole United States on CD ROM or magneto-optical disk. These files can be massive; the street file for Santa Clara County, California, alone is 14MB. You can also buy higher-priced street files—GDT DYNAMAP/2000, with more-complete address information; and Etak MapBase, with better coordinate accuracy.

There's a lot to Atlas Pro, and yet it's moderately easy to learn—it would be easier if the thorough command reference guide had a decent index. The organization of the menus also slowed down my learning; commands just weren't where I expected to find them. For example, the View menu has only some of the commands for changing the view (others are on the Geo and Page menus), but it does have text-formatting and window-management commands. When I needed help, however, tech support responded promptly to my voice-mail message, and the technician was courteous and knowledgeable. (Technical support is free except for the cost of the phone call.)

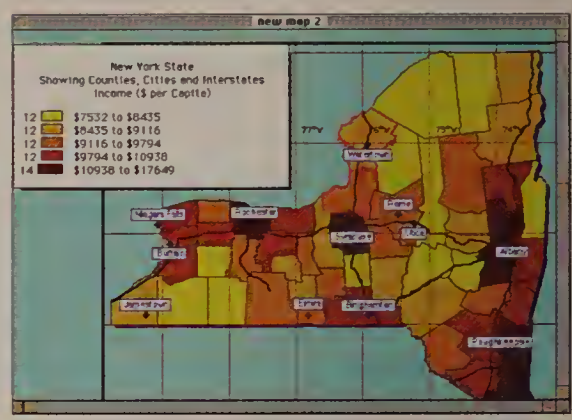
To make a new map, you fill in a series of dialog boxes to specify the size of the map (up to 10 pages by 10 pages) and set the scale (a little tricky to do), then select a base map and say which other maps you want to layer on top. For example, you might want to select all Nevada counties and some California counties and layer them with interstate highways. (You can add other layers later.) Generally you put each type of information on a different layer so you can manipulate the data more easily. Then Atlas Pro displays the map. If you want to make a thematic map, you then choose the data to display and how to depict it—which symbols and/or shading patterns or colors to use. You can thematically map any layer, but only one at a time. You can quickly compare data—say, population from 1980 with population from 1990—on thematic maps by mapping one factor, specifying the second in a dialog box, and switching between the two resulting maps.

If you're preparing a map for publication, you refine its appearance by formatting the legends and other text on the map. Tear-off tool, pattern, and color palettes make the process relatively easy. You can control each map layer individually—making it visible or hidden, giving it a different line width, color, pattern, and so on. You can also save a map in a draw-program format and enhance it in a draw program.

Atlas Pro is one of the most System 7–savvy programs you can buy, and it can really take advantage of publish and subscribe. For example, you could link a map to your sales-by-territory report in a Microsoft Excel or Lotus 1-2-3 spreadsheet. Then when you change the figures, Atlas Pro updates the map automatically. Or, with an Apple events script, you could create a slide show that animates how your data changes over time—for instance, a time-lapse view of customer growth by region during the past 12 months.

Unlike most GIS programs, Atlas Pro imports geography files (with the exception of street files) and attribute data to its map files, rather than linking the data to a map. That makes maps more portable, but it limits how much you can zoom a map's scale up or down. You can use publish and subscribe to establish a live link to attribute data, or update the map periodically by hand to catch up with data changes.

You can create data that you want to map within Atlas Pro or import data from spreadsheets, databases, or other files. Atlas Pro directly imports dBase III Plus and FoxBase+/Mac files. To bring in spreadsheet files, you can either subscribe to the spreadsheets or first convert them to tab- or comma-delimited ASCII text. With Fairfield Software's ClearAccess you can also use DAL to query remote SQL databases to extract data.



Thematic Mapping Plus The counties of New York state, shown in five equal-size groups of per capita income, are overlaid with interstate highways and selected cities to show the relationship of income to urban areas.

In thematic mapping, you can set the number of data divisions and choose the classification method, such as four equal-size groups of areas. Only numeric data can be thematically mapped, however, and you can't choose your own labels for data divisions. This means that categories such as wheat, corn, and fallow must be coded as numbers in your data—1 for corn, 2 for wheat, and 3 for fallow, say—and the legend uses the same codes to distinguish them. Later you can paste text labels over the codes when you tweak the final map for presentation or printing.

Atlas Pro handles color well, choosing a sensible series of colors to represent the related data, but you can also use the program on a monochrome monitor. Redrawing takes time, however, and every time a map changes—or whenever a dialog box covers part of the map—Atlas Pro starts to redraw. Fortunately, you can halt redrawing by clicking the mouse, so you can postpone changes and redraw a batch of them at once.

Have I mentioned Atlas Pro's ability to match data points to street addresses? Combine areas into territories and group their data? Group and display data on a map by zip code area? Move objects in front of or behind other objects? Create simple bar and pie charts? Autotrace any enclosed space to create an area? Clearly, this is a powerful, feature-rich program at a competitive price. Atlas Pro is a bit like Fibber McGee's closet—packed with lots of stuff you never expected to be in there. When you open the door, however, it doesn't all come tumbling out; you may have to dig to find something.
—PETER VAN DEMARK

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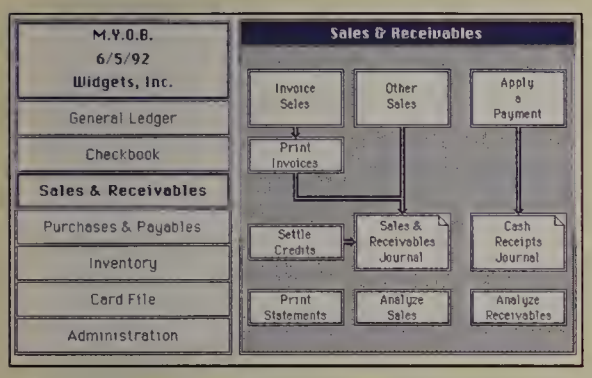

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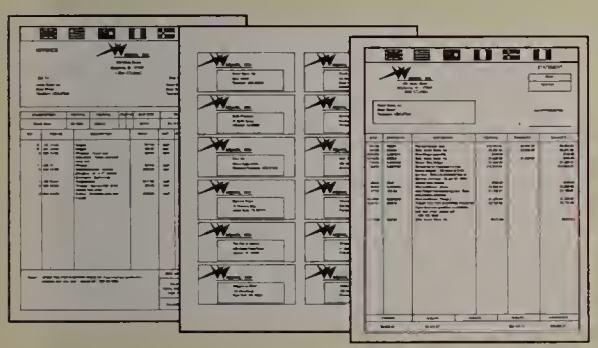

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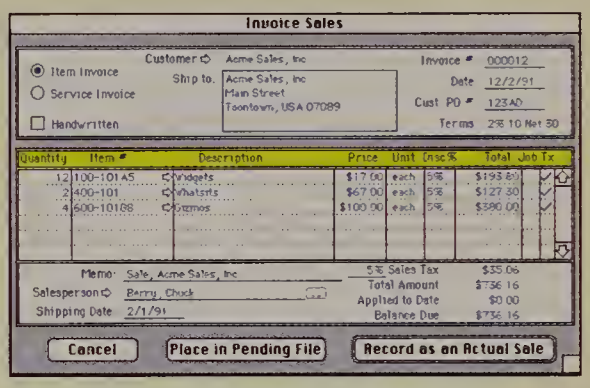
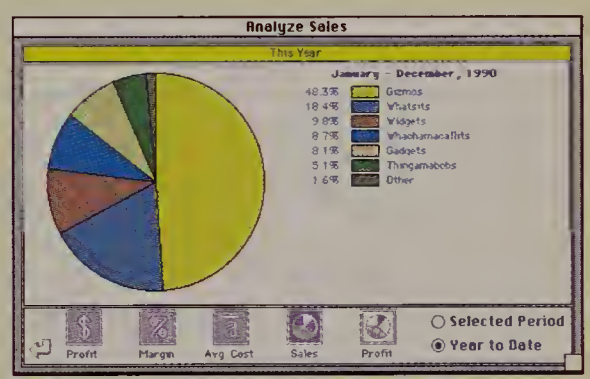


"Only a few programs make good use of the Macintosh interface. Teleware's M.Y.O.B. has one of the best interfaces." MacWorld



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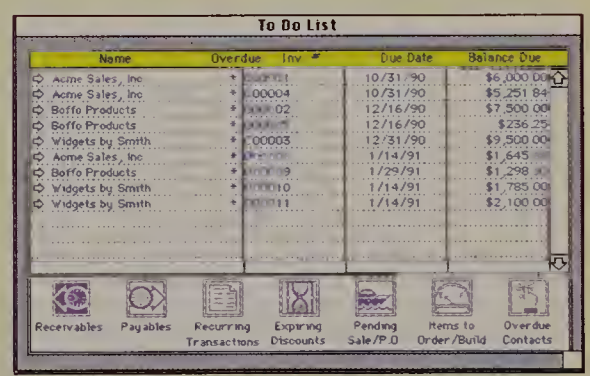

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Image-Melding Movie Utility

Morph 1.0

PROS: Clean, smart design; works well; inexpensive; good, concise manual. **CONS:** Only morphs still images; some bugs; understaffed help line. **COMPANY:** Gryphon Software Corporation (619/454-6836). **REQUIRES:** Mac II; 5MB of RAM; hard drive; System 6.0.7. Recommended: 8MB of RAM; color monitor. **LIST PRICE:** $149.

MW ★★★

ANYBODY WHO'S EVER BOUGHT A copy of *People* or *Entertainment Weekly* knows what morphing is. It's the hot new film special effect, made famous by the shape-changing villain in *Terminator 2* and the string of happy dancers in Michael Jackson's "Black and White" video, wherein the image of one person or object visibly "melts" into another. Even if you play back these scenes frame by frame on a VCR, you can't fathom how it's done. You stare, amazed, as a person's forehead simply gets taller, or the eyes drift apart, or the cheekbones slide into greater prominence.

Morph is a one-trick-pony utility program: you feed it a starting picture and an ending picture, and it creates a QuickTime movie (or PICS animation file, or PICT still image) showing one becoming the other. First, you have to come up with two compatible still images that will look good when morphed. You can't use just any old images; if you tried to morph, say, a tree into a car, you'd get a blurry crossfade instead of a crisply delineated, visible transformation. That's why heads of people and animals are the most frequently morphed subjects. For the morphed movie from which several frames are shown here, I digitized pictures of my niece and my grandfather from a videotape, using a SuperMac VideoSpigot digitizing board.

For use with Morph, the images must be precisely the same size, must have 72-dots-per-inch resolution, and it's best if the backgrounds are similar. If the backgrounds are different, you're supposed to eliminate them altogether (as in the example here), using a graphics program like Adobe Photoshop. You're in for trouble, too, if there's a protuberance or other element in only one of the images; for example, a lady with a beehive hairdo wouldn't morph smoothly into a picture of a bald guy. In short, you'll probably spend a good deal of time in Photoshop messing with the size, background, angle, lighting, and other elements of the pictures you want to blend.

Into the Studio

AT LAST YOU LAUNCH THE COMPACT 275K Morph program. You open your two pictures—the start image and end image—in side-by-side windows. This is the clever part: to indicate how each element of the first picture should become the second, you click into place tiny glowing dots called *key points.* You place them at the corners of the eyes, along the hairline, at the tip of the nose and chin, and so forth. As you place a key point into the start image, a corresponding glowing point appears on the end image. Since the nose tip (for example) probably isn't in precisely the same spot in both images, you drag the end image's dot so that it *does* rest on the nose tip.

Getting the Points To teach Morph how the first image should become the final one, you place a glowing key point on each important feature, and then adjust the corresponding point in the opposite image. Using the line tool, you can draw nonfunctional white lines that help you keep track of your points (and ensure that you don't accidentally place points out of order).

The more key points you add, the smoother and more successful your morph will be. If the images are similar to begin with, you can probably get by with as few as ten points; if they're complex, or if the face changes angle during the process, you'll have to spend a lot longer placing and positioning key points.

As you work, a preview feature lets you spot-check your progress. If you're creating a movie morph—the usual case—a slider lets you select which single frame you'd like to preview. Depending on the Mac and the image size, it takes about ten seconds for the program to create a still-image preview, showing the merged result. Being ten seconds away from seeing how you're doing isn't ideal—you feel distanced from the final product—but at least you can spot major problems (beehive hairdos, for instance) before committing them to the final movie.

When you're done placing key points, your images look like they've been riddled with glowing buckshot. In a dialog box, you specify the usual QuickTime-movie settings, heeding the usual QuickTime trade-offs (a movie with better picture quality takes up more space on the hard drive and has jerkier playback). Then choose Save Movie from the File menu and go to dinner; creating a morphed movie can take a while. (A 10-second sequence like the one here took 15 minutes on a Mac IIcx with 8MB of RAM to generate as a QuickTime movie.)

Morph or Your Money

THE 65-PAGE MANUAL HELPFULLY COVers special effects, common problems, and suggestions for getting the best results. It doesn't simply point out that option-clicking on a key point brings up timing controls for its color and position shift; it also explains why that's useful (so that you can make different parts of the image change at different times).

Alas, Morph 1.0 suffers first-release glitches. It's incompatible with Salient's DiskDoubler and Icom Simulations On-Cue, and it may conflict with other QuickTime software. These bugs will be fixed, says Gryphon, in the next version (in testing at press time). And Gryphon was caught unprepared for Morph's sudden success; the overwhelmed phone staff is virtually unreachable. The company is scrambling to remedy this problem, too, saying that additional technicians are being hired, and promising to return any call within 24 hours.

It would be nice if Morph were faster; it would be nice if you could morph moving images (like the bopping multicultural morphees in the "Black and White" video) instead of just still frames; it would be nice if the program were as

continues

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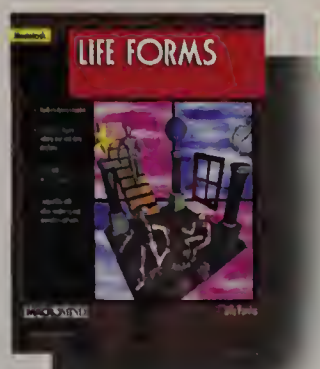

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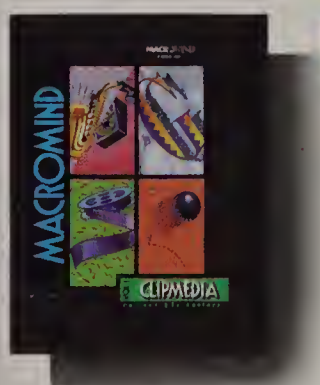

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BEHIND THE SCENES AT MACROMEDIA

Young Harvill—artist, holographer, virtual reality inventor, and Director of 3D Product Development—talks about Macromedia's newest 3D modeling package and how it lives up to the design team's original ideals.

What did you set out to do in designing MacroModel?

We wanted to create a modeling environment that was as easy to use as Swivel 3D, as fast as Swivel 3D, but very accurate and capable of doing anything from concept design through CAD.

We also wanted to build a core technology that would last five to ten years, that would be a key part of the technical equity of the company.

How is MacroModel more compatible with CAD than other modelers?

The accuracy is very important. So are CAD functions like 2D and 3D snapping, being able to snap to exact geometry.

That's a main difference between Swivel 3D and MacroModel. With Swivel 3D, pretty much all the modeling is approximate—it's great for presenting concepts—but with MacroModel you can actually start with a plan or drawing and by typing in numbers and snapping to points, come up with an exact representation of your object.

That you could then use to pass on to manufacturing?

Yeah, you could use it to develop a comprehensive set of drawings for engineering or to go out through DXF to a CAD/CAM environment.

What do you mean by 2D and 3D snapping?

That MacroModel is very similar to [Adobe] Illustrator and other illustration programs, in that you're always drawing on a 2D surface that's called the working plane. Most often that plane is flat on the screen, but you can place the plane anywhere in the world, say at an angle or on top of a building, and extrude a water tower, or whatever you like, in that plane.

The plan was to give people who are familiar with 2D CAD and illustration programs all of the tools they're used to using on 2D surfaces, but once they start extruding or sweeping they can jump off into the third dimension.

I think we've been pretty successful at it.

Now, for rendering, you'd really want to use Three-D or MacRenderMan, right?

That's true. MacroModel's rendering is what I'd call a draft-to-good quality rendering. For the real high-quality photorealistic rendering you'd want to go to [MacroMind] Three-D for animated rendering, or to [Pixar] MacRenderMan for still-life rendering.

You hear a lot about modeling speed. How fast is MacroModel?

Well, one of the main things we tried to achieve was to have smooth-shaded hidden-surface images of objects be updated in a reasonable time as you model them. Basically we had to write a highly optimized renderer.

Just to give you an idea, right now we're essentially comparable with the speed of Swivel 3D, so we're rendering about 1,000 polygons per second on a IIci. And on a Quadra, just in terms of the interactivity and responsiveness of the edit, we're approaching a Silicon Graphics Personal IRIS kind of speed.

So Swivel 3D and MacroModel are both modelers with roughly the same speed . . .

Yeah, that's right. But they're pretty much different tasks—going from concept modeling [Swivel 3D] to having a real numerical model with curved surfaces [MacroModel] to prepare for CAD or working drawings, or to use in animations.

What we're seeing is that people who want to graduate from display modeling to models that have real dimensions—if they're trying to model real products, or extremely large worlds, if they need curved surfaces—then they should move up to MacroModel.

And MacroModel does spline-based modeling rather than polygons. What's the advantage?

Polygons are fine to model flat surfaces. But if you have objects with curved surfaces, the advantage to representing them with curved surfaces—splines—is that you can render at various levels depending on how much time you have or how much update speed you want.

In the long run, representing curves as polygons is just an approximation. It's not accurate.

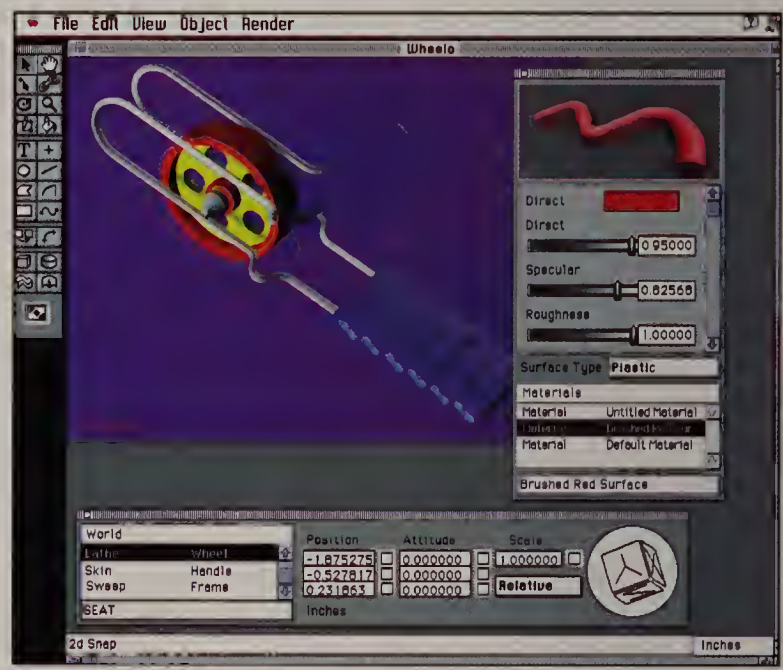
What do you love the most about MacroModel?

The thing I enjoy as a user is that when you create an object, MacroModel remembers how you created it. So if you make a Bezier line or put out a letter that has an Illustrator-like outline and then extrude it, MacroModel doesn't forget that you extruded it from this profile.

So you can go back and edit the original object and the extrusion changes too?

That's right. That was a goal we had at the beginning—and we kept it for all the different object types—that you can go back and edit the defining geometry and get updates in a reasonable time.

Other things I like are all the neat user interface things like the track ball interface, the browsers, and the numerical updating. I think it worked out really well. I think people are going to be jazzed.



Does anyone else do all this?

They're beginning to. But this is the sort of stuff you have to do at the beginning—you can't go back and add it on. So I think a lot of our competitors, once they see this, are going to have to go back and rewrite everything.

MACROMEDIA

slick and polished as Mr. Mercury in *Terminator 2*. But using Morph is simplicity itself. The price is certainly right. And with patience and experience, you can use Morph to perform the ultimate transformation: changing yourself from a desktop-video dilettante into a high-tech special-effects wizard.—DAVID POGUE

Integrated Architectural CAD Software

DesignCAD Macintosh 3.0.1

PROS: Good rendering capabilities with flat, Gouraud, and Phong shading options; good 2-D and 3-D importing and exporting capabilities; directly exports RIB files to MacRenderMan; good value. **CONS:** Slow rendering; no tutorial in the manual; can't combine objects or create holes in them. **COMPANY:** DesignCAD (918/825-4848). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.5; hard drive. Recommended: Mac II with math coprocessor. **LIST PRICE:** $299.95.

MW ★★★

DESIGNCAD, A GENERAL-PURPOSE 3-D modeler with 2-D drafting capabilities, represents a price and performance breakthrough in 3-D modeling programs. With a list price of $299.95—and street pricing as low as $160—DesignCAD provides modeling and rendering features usually found only in packages in the $1000-to-$2500 range.

DesignCAD is a true surface modeler, with design and editing tools—including excellent 2-D spline and 3-D surface tools—that enable you to create almost any shaped object. Because it's not a solids modeler, however, DesignCAD can't punch holes in objects or combine them through Boolean operators to create a new object. As a true surface modeler, it creates files with all the information needed to get excellent rendering results from high-end rendering programs, like MacRenderMan.

DesignCAD itself offers extensive rendering choices. Besides hidden-line and mesh surfaces (which show just the exteriors of objects), the program provides flat, Gouraud, and Phong shading, plus transparency and specular-reflection options. Each of DesignCAD's four viewing windows (front, side, top, and isometric) can be rendered independently; and within a window, you can mix rendered and wire-frame objects. You could, for example, display the planes of a room in wire-frame but fully render the contents—which will look like a transparent room containing a carefully modeled interior design.

DesignCAD has a complete assortment of design, editing, and dimensioning tools that work in a Mac-like manner. It also has locational modifiers like ClarisCAD's that let you precisely snap to or locate objects and/or points in a model. Tool palettes float in windows that you can place anywhere on screen. The program comes with a library of approximately 500 symbols. The company also offers an optional collection of 6700 symbols for $179.95.

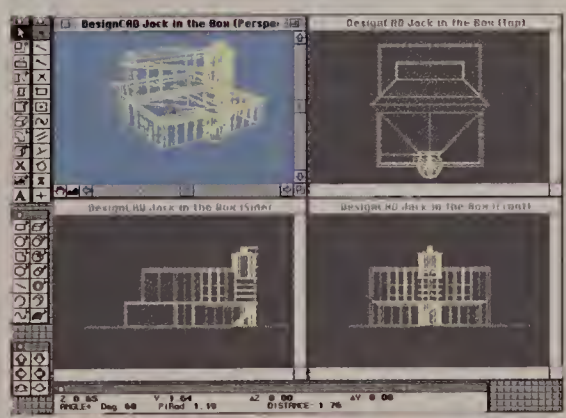
Four-Way Windows

ON START-UP, DESIGNCAD DISPLAYS all four views in tiled windows, a way of displaying 3-D space that is familiar to anyone who has ever taken mechanical drafting. In addition, a dynamic viewing toolbox contains simple arrow controls that let you "fly around" or "walk inside" a design. However, if you want to work on a model from the bottom or the back, you're out of luck. You can orient the isometric view to look at a model from any direction, but to modify or move objects, you must use the front, top, or side view.

The four concurrent windows come in handy for orientation, but they are not set up very practically. Every time you make a change—even when you merely select an object—you have to wait for all the windows to redraw; at DesignCAD's slow rendering pace, that can try your patience. You can halt in mid-redraw by pressing the H key, but that leaves you with a partially drawn window. I wish DesignCAD let you choose when to redraw, as many other CAD programs permit you to do.

The four-way tiled views are of limited value with 13-inch monitors. You need big windows for display at a workable scale—especially with architectural models. Of course, you can always close one or more of the views while you work. You can also save viewing preferences (background color, grid and axis lines, angle of isometric view, and so on) for the windows as a setup file for future use.

Architects may have problems with DesignCAD's window environment because true sections cannot be created through a model. You can set the Global Origin (working plane) separately for each window so you can precisely locate objects within a model, but you still see every object in front of and beyond the working plane. Working on individual objects on a building or other complex model can become disorienting—a case of not being able to see the tree for the forest. Too bad you can't temporarily hide objects from view. As a workaround you can place the objects you want to hide on a separate layer and then hide that layer—the program does have good layer controls.



A Room with Four Views DesignCAD's working environment offers four views of your work—front, side, top, and isometric.

File Translation

BESIDES THE BASIC DESIGN SOFTWARE, DesignCAD includes Importer and Xporter file translators that alone are worth the price of admission—many stand-alone CAD-translation packages cost about as much as DesignCAD. Importer can import DXF (Release 10), IGES, XY or XYZ coordinates, and 2-D and 3-D files from DesignCAD's MS-DOS version. DesignCAD can also read or directly export PICT files, although files exchanged in that format lose accuracy. DesignCAD's Xporter program exports all those formats, plus EPS; RIB, which is MacRenderMan's native file format; and the HPGL and DMPL plotter formats.

The EPS translation comes in handy for people who need to send images of 3-D designs to page-layout programs. When converting images to EPS format, you select specific views of your 3-D models. For isometric views, you can further specify an orthographic or perspective version and set the angle of view.

I especially like the ability to read and export XYZ coordinates from DesignCAD translator programs. It's a boon for designers who need to import raw data from survey instruments to create 3-D topographic maps or to export design data to a spreadsheet for additional analysis.

Getting up to Speed

DESIGNCAD REPRESENTS A GREAT value among 3-D CAD modelers. It offers powerful tools for the money, so it's hard to complain about what's missing. But even its bargain price can't compensate for some of DesignCAD's problems. The biggest shortcoming is its speed, especially in making selections, redrawing, and rendering. On complex models with many objects (like a medium-size building), simple tasks like selecting a wall to move are unacceptably slow on a Mac IIcx. I can't imagine anyone tolerating running the program on a 68000-based machine,

continues

which the developers claim is possible. The program also required considerable memory allocation (4.8MB) to open a model of a small building that had been converted from a 3-D DXF file.

Any CAD program takes time to learn, but the process is made more difficult with DesignCAD because the instructions do not include step-by-step guides or any tutorials. The company is at work on a tutorial video, but I have yet to meet a CAD video that didn't put me to sleep. The program does come with a clear and concise reference manual, but it's difficult to grasp the practical utility of a CAD tool from an out-of-context description in a reference guide. I found the technical-support staff helpful but hard to reach; at the time of this review there were only two people on the Macintosh side of the tech-support staff.

Industrial or product designers should consider adding DesignCAD to their collection. As an architect, I'm less enthusiastic, due to the four-window interface and slow speed with complex models. But DesignCAD's low price could let you also buy that accelerator board you've been eyeing and still total up less than you'd have to pay for any other 3-D modeler.
—DANIEL M. GONZALES

Automated Draw Program

Aldus Intellidraw 1.0

PROS: Links objects physically and dynamically; Symbol feature permits global editing; flip-book feature permits cycling through alternative versions during on-screen presentations. **CONS:** No masking; can't measure angles between lines; insufficient free-form drawing capabilities. **COMPANY:** Aldus Consumer Division (206/628-5739). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.5. **LIST PRICE:** $299.

MW ★★★★

IMAGINE A DRAW PROGRAM THAT costs $100 less than MacDraw Pro but offers many of the best object-editing features from Adobe Illustrator, Deneba's Canvas, and Aldus FreeHand. Then imagine that the program enables you to link objects together physically, so they stick together, and dynamically, so that changes made to one object affect all duplicates of the object. Now throw in custom alignment options, multipage documents with editable master-page elements, and better presentation capabilities than any other draw program. Sound fantastic? Then you haven't seen Aldus Intellidraw.

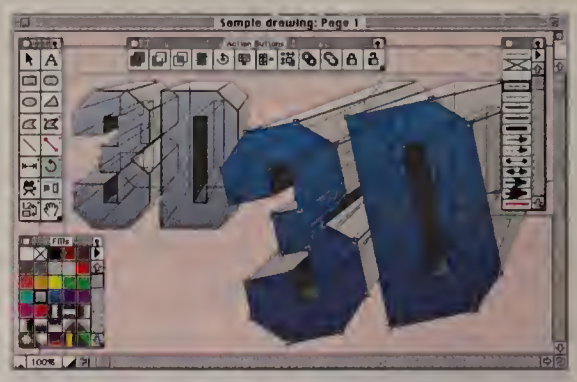
First among Intellidraw's smart features are the connector tools, which let you string objects together like charms in a bracelet. Once you connect two objects, they move, rotate, and resize together. For example, if you fix the length of a connector, Intellidraw maintains a constant distance between objects while allowing the angle to vary.

You can also use Intellidraw's alignment and distribution commands to connect objects. This means that if you link two walls in an architectural plan so that two perpendicular walls align, they remain aligned until the link is broken. Or if you distribute three columns evenly around a circular courtyard and then duplicate a column, Intellidraw automatically redistributes the four evenly. By defining the physical relationships between objects, you can perform revisions without worrying about messing up an illustration.

Intellidraw combines features found in some of the most popular Mac draw programs. For example, you can link text blocks so that text flows from one column into another, as in Illustrator. You can create intermediate blends between several objects at a time, as in Canvas, and edit those blends after their creation, as in that fellow Aldus program, FreeHand. Better yet, Intellidraw provides an independent window for editing blended objects, which visually isolates the original objects from the blended shapes. Intellidraw also mimics FreeHand by providing multiple layers, by allowing you to draw in either a preview or wire-frame display mode, and by letting you undo up to 99 consecutive operations.

Intellidraw borrows most heavily from Canvas. Like Canvas, Intellidraw can merge selected objects by tracing around their combined outlines or by subtracting the intersection of one outline from another. A third merge function, Intersect, is more limited than Canvas's. Whereas Canvas masks selected shapes with respect to the frontmost object, Intellidraw retains only the shapes that occur at the intersection of all objects, making it useless for masking. While Canvas beats Intellidraw in the combined-shape department, Intellidraw excels at measuring and labeling objects. Like Canvas, Intellidraw can calculate the height, width, or perimeter of a selected shape according to the current scale of measurement. But while Canvas goes further—additionally calculating the angle between two lines, the diameter of an ellipse, and the area of any closed shape—Intellidraw alone links objects and dimension labels together so that changes made to the object are automatically reflected in its label, and vice versa.

You can match the height and width of objects so that resizing one object automatically resizes the others. If your plan



Together Forever To create the left-hand *3D*, I first converted the characters to editable outlines and cloned the outlines. Then I used the Connectigon tool to draw a series of polygons that connect the clones with the originals. (All outlines appear superimposed in light gray.) I could then scale and rotate the cloned objects without separating them from the originals, as shown on the right.

or schematic drawing includes a variety of repeated images, Intellidraw can store the original as a symbol and link all duplicates to it. Then you can make global changes by editing the original image in the Symbol window, updating all duplicates at once. You can even globally replace one image with another.

Another crowd-pleaser is the flip-book feature. If you're not sure which of three logos your client will prefer, you can include all three in a prospective layout so that only one logo appears at a time. To cycle through the images in a flip-book, simply double-click on the current image.

As a planning and presentation tool, Intellidraw rates very high. Where Intellidraw disappoints is in the free-form drawing department. It lacks a Bézier-curve tool as well as much of the functionality that goes with it, such as the ability to join and split paths and to reshape simple geometric objects, and other curve-editing capabilities most intermediate and advanced artists take for granted. Also, you'll gnash your teeth trying to link curved shapes with the Connectigon tool. You can't see the points (which serve as attachment anchors) in the curved shapes while drawing the links. Nor can you duplicate a portion of a shape and convert it to a Connectigon, forcing you to constantly trace shapes to link them.

Although Intellidraw won't eliminate all your graphics woes, it's nevertheless the first general-purpose drawing tool devoted to the task of automating the creation of object-oriented artwork. Simply put, it expedites the revision process better than any other draw program.

If you're an engineer, architect, or artist whose work tends more toward planning and design than free-form illustration, Intellidraw is a great environment for drawing and demonstrating your ideas.—DEKE McCLELLAND

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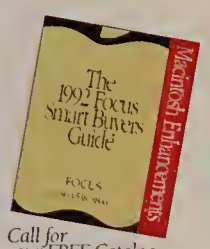

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Input Devices

Mouse-Trak

PROS: Smooth trackball motion; built-in wrist pad. **CONS:** Must be disassembled to reconfigure buttons; awkward placement of third button. **COMPANY:** Itac Systems (214/494-3073). **REQUIRES:** Any Mac with ADB port. **LIST PRICE:** $179.

MW ★★★

Turbo Mouse 4.0

PROS: Extensive configuration options; automated cursor placement; extra ADB port. **CONS:** Lacks handrest. **COMPANY:** Kensington Microware (415/572-2700). **REQUIRES:** Any Mac with ADB port; System 6.0.5 (for trackball plus software). **LIST PRICE:** $169.95.

MW ★★★★

IN MY CONTINUING ADVENTURE with input devices, I received the Mouse-Trak from Itac and the Turbo Mouse from Kensington.

Mouse-Trak

IF SOUND MATTERED IN EVALUATING input devices, then Itac Systems' Mouse-Trak would easily top my list of recommended trackballs. The noise the ball makes when it rolls is as satisfying as the thunk you hear when you shut the door of a well-designed car. Mouse-Trak does have more than just sound going for it, though. The trackball is well positioned and easy to rotate, and the soft wrist-pad built into the housing makes the Mouse-Trak comfortable to use.

The two buttons that flank the trackball fall naturally under the thumb and little finger, although they could be a bit larger. In Mouse-Trak's default configuration, the left button functions like the one on a standard mouse, while the right button produces a continuous mouse-down signal for clicking and dragging. Pressing the third button is the equivalent of double-clicking, but its location between the wrist pad and trackball is harder to reach. A small switch near the wrist pad toggles between normal and ballistic trackball operation. In normal use, the cursor moves a certain distance depending on how far you roll the ball. In ballistic mode, rapid trackball movements are amplified so that the cursor moves a greater distance than it normally does when you roll the ball a certain distance, a convenient feature if you're working with a large monitor.

While Mouse-Trak's default button layout is fine for right-handed users, most southpaws will opt to reverse the functions of the two side buttons. Unfortunately, you have to disassemble the trackball and move jumper plugs to reprogram button operation. While this isn't difficult if you're handy with a screwdriver and pliers, it is possible to damage internal components while moving the jumpers. External configuration switches would be an improvement, and software control would be better still.

Turbo Mouse 4.0

SUPERFICIALLY, THE TURBO MOUSE IS almost identical to the trackball that's been a perennial favorite in surveys like *Macworld*'s World-Class Awards. The removable ball glides freely, and the large buttons on either side provide just the right measure of tactile feedback. Its cord is removable, and the Turbo Mouse sports a second port for a mouse or other ADB device. My only quarrel with Kensington's design is the lack of a handrest—the Turbo Mouse was much easier on my wrist when I placed a soft pad in front of the trackball.

What really makes the Turbo Mouse stand out is the software, which includes a System extension and an application. The application lets you customize many of the trackball's functions. Using a feature called Custom Acceleration, you can specify how the cursor reacts to trackball motion. (This feature is similar to Mouse-Trak's speed control but allows for more precise control of cursor response.) In comparison with software from some other input device vendors, the Turbo Mouse interface is simple and intuitive. What's more, custom acceleration works with other manufacturers' ADB mice and trackballs.

The Turbo Mouse application lets you program the trackball's two buttons via pop-up menus. (Functions can also be triggered by pressing both trackball buttons at the same time, in effect adding a third virtual button.) Buttons can be set to double-click, click-lock, or send a string of up to 40 characters to the Mac. Slow Cursor causes the cursor to move slowly (handy for precision work), while Axis-Only constrains cursor movement to the horizontal or vertical direction.

Brilliant Cursor is another novel Turbo Mouse enhancement. This feature lets you define special locations on the screen called HotSpots. When you invoke Brilliant Cursor by pressing a user-defined trackball button, the cursor snaps to the nearest HotSpot as soon as you move the ball. To assign HotSpots, you press a special key combination and click on any place on the monitor you want to define as a HotSpot. A graphic symbol marks each HotSpot (the symbols appear only while HotSpots are being defined), and clicking on an existing HotSpot clears it. When you're done, HotSpots are automatically stored for later use.

Mastering Brilliant Cursor requires some trial and error. (Fortunately, you can restore Kensington's standard HotSpots by typing ⌘-R.) For example, I learned that assigning HotSpots to two closely spaced menus makes it difficult to select either one. After a few hours, though, I began to appreciate Brilliant Cursor, especially while working on a 19-inch monitor. By defining HotSpots carefully, you can avoid hunting around the screen for frequently used menus and palettes. Still, as ingenious as Brilliant Cursor is, HotSpots represent only absolute screen coordinates: when you move an object for which you've defined a HotSpot, the HotSpot doesn't shift with it.

All the programmable features, including Brilliant Cursor, can be made application-specific. For example, you can customize a unique set of acceleration parameters, button functions, and HotSpots for every application. Sets load automatically when you launch applications; if no specific set has been defined, or if you switch to the Finder, the default Turbo Mouse button assignments and HotSpots take over.

In choosing a pointing device, you should evaluate everything from the size of your hand to the layout of your work space (see "Input Alternatives," *Macworld*, June 1992). Judged on the basis of hardware alone, both the Mouse-Trak and the Turbo Mouse work well, although having to dismantle the Mouse-Trak to reconfigure its buttons is a bother. On the other hand, Kensington's Turbo Mouse represents a real breakthrough in trackball software design. If you're shopping for a trackball, Turbo Mouse deserves first consideration.—FRANKLIN N. TESSLER

TOM GIBSON

The Mouse-Trak (left) and the Turbo Mouse 4.0

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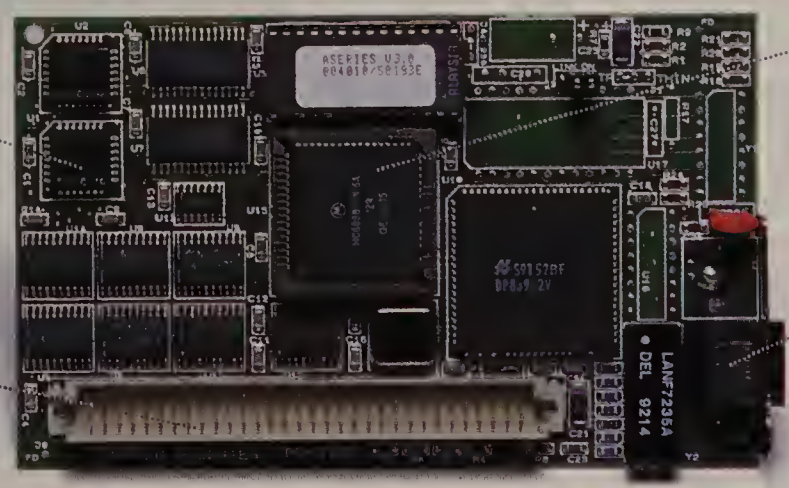

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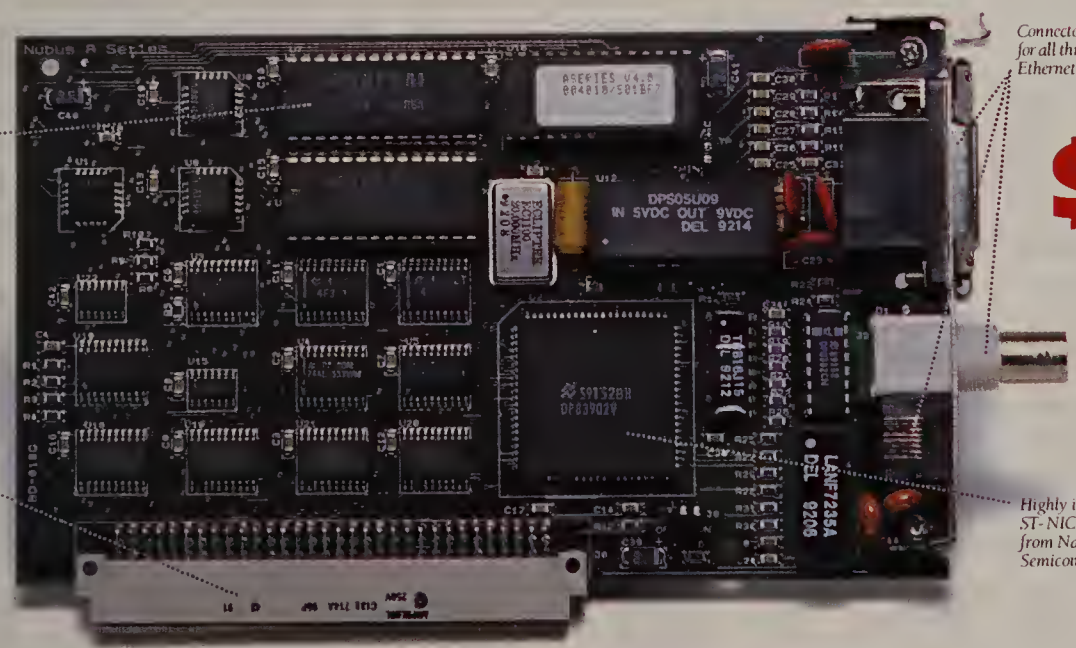

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Circle 90 on reader service card

Animation Program

Motion Works Promotion 1.0

PROS: Inexpensive; includes CD filled with images and sounds; user-controllable animation speed; in-depth support for Apple events. **CONS:** No support for QuickTime compression; labor-intensive interface; occasional bugs. **COMPANY:** Motion Works (604/685-9975). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.7. **LIST PRICE:** $395.

MW ★★

PROMOTION WINS THIS MONTH'S award for the most pronounced split personality: half-impressive, half-dreadful. In some respects, the program redefines the animation environment admirably, yet I hope future applications won't emulate it.

Like other animation packages, Promotion divides the elements of an animation into three groups: actors (moving images), props (still images), and sounds. For creating and editing actors and props, Promotion supplies a modest set of painting tools. You can't record sounds within Promotion, but you can edit imported sounds by adjusting volume levels, adding echoes and fade-ins, and playing sounds in reverse. If these controls aren't enough, you can import PICT images and SND files from other programs. Promotion even supports JPEG compression.

If you can't draw and your Mac has no microphone, you'll be glad that Promotion includes the PrimeTime CD, which retails for $100 when purchased independently. (If you don't own a CD ROM player, you can exchange the CD for floppy disks.) Chock-full of actors, props, and sounds that go together like coordinated three-piece suits, PrimeTime expands the abilities of casual users and affords intermediate users the option of assembling speedy presentations at the last minute.

That is, production would be speedy if it weren't for Promotion's laborious import function. Although each PrimeTime file provides multiple actors, props, and sounds, you can import only one object at a time via a mind-numbingly slow three-step procedure of opening the host file, selecting the object you want to import, and confirming the object's name.

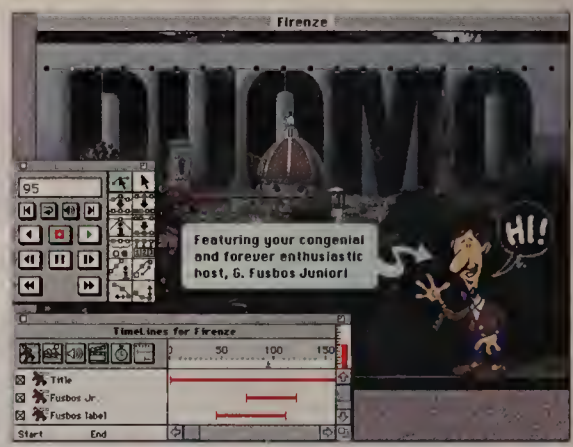
To animate an actor, you can draw it frame by frame using the painting tools; rotate, scale, or fade it using tweening (as in *between*) controls; or move it along a path. Promotion's path tools are especially flexible, letting you specify the exact point at which you want the actor to appear in each and every frame. On the downside, you can't constrain the position of a point by pressing the shift key, so it's difficult to move an actor in a straight line.

To oversee your entire animation, Promotion provides a TimeLine window that shows the number of frames occupied by each actor, prop, and sound. To better control the pace of an animated sequence during playback, you can insert events, which tell the program when to load images and sounds into memory. The loading process takes time, and when unaided by an event, it can interfere with the pace of playback. By inserting an event, you can instruct Promotion to load an object during a natural pause in a sequence so that the sequence plays back without any breaks. The TimeLine window also accommodates interactive cues, so you can insert buttons in a file that let the viewer navigate a run-time presentation at his or her own pace.

Perhaps Promotion's most amazing feature is its ambitious support for Apple events. While other Mac programs support the four core events allowing you to open and close files remotely from a second application, Promotion supports these and 200 others, making it the most System 7–savvy animator I've seen. This means, for example, that you can readily retrieve Promotion information from within HyperCard, UserLand Software's Frontier, or another client application. Few beginners and intermediates will exploit these features, but gear-heads and programmers can have a field day.

When you complete your animation, you can store it in a variety of formats. For displaying on other Macs, you can save your sequence as a self-running application that launches without Promotion installed. Promotion also exports to the QuickTime format, but it neglects an important step by failing to allow you to specify compression settings. If you want to record your animation to videotape, Promotion can automatically drive any device that supports Sony's ViSCA (Video System Control Architecture) protocol. Also, you can save a sequence as an After Dark screen-saver module.

If Promotion were as good as the sum of its parts, I'd recommend it with few reservations. But Motion Works has strung these capabilities together with a weak and problem-ridden interface. Granted, novices will find Promotion easier to learn than a heavy-duty animator like MacroMind Three-D, but few adept users will confuse Promotion's easy learning curve for convenience. Here are just a few examples. When creating text, you can't simply enter a type size into an option box; you have to click and click on tiny up and down arrow icons as if the keyboard had never been invented. The eyedropper



Points of Progress In Motion Works Promotion, each round point on the path at the top of the screen indicates the location of the upper-right corner of the word *Duomo* in a frame of animation.

tool works only in the foreground window, preventing you from, say, matching the colors in the current actor to the colors in a prop. When drawing an actor, you can't preview the appearance of a specific frame against its background, denying you a glimpse of the big picture. While the paint window offers an antialiasing function that softens every frame in an animated sequence, you can't soften the actor with respect to its background, vastly undermining the utility of the function. Many operations, including antialiasing, can't be undone, and because Promotion doesn't warn you as you embark on an irrevocable operation, you can very easily ruin an animated sequence. You can't duplicate an actor or prop using the Copy and Paste commands; instead you have to reimplement the Place function.

I also met with a few bugs. After I deleted a large prop from the TimeLine window, the Undo command wouldn't work, even though it was available on the menu. Since Promotion automatically updates the animation file to disk, I was unable to retrieve the prop via, say, a Revert command. Also, Promotion occasionally displayed the wrong command name. For example, choosing the Hide TimeLine command frequently displayed the TimeLine window instead of hiding it. Finally, Promotion is incompatible with SuperMac's Spectrum/8 24 PDQ video board and driver, crashing and deleting files when you save a run-time presentation to disk.

The Macintosh community cries out for a reasonably priced, moderately powerful animation package. But while Promotion provides a slew of tempting features, Motion Works needs to put some serious effort into revising the interface and improving Promotion's convenience features. After all, we use software to expedite tasks, not to make them more laborious. Despite its fine features, the wearisome Promotion remains unprepared for its PrimeTime. (Go ahead, you're supposed to groan.)—DEKE McCLELLAND

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Personal Information Manager

Connections 2.1

PROS: Excellent variety of printed report formats; can link entries listed in various stacks. **CONS:** Sluggish performance; can't edit schedule in monthly view; buggy. **COMPANY:** Concentrix Technology (415/358-8600). **REQUIRES:** Mac LC; 2MB of RAM; System 6.0.5 (System 6.0.7 for voice alarms); hard drive. **LIST PRICE:** $199.

MW ★★

THE NEW VERSION OF THIS HYPERCard-based personal information manager boasts a wider range of scheduling features, new printing options, and improved networking capabilities. But the update fails to address the program's most serious flaw—it's too slow.

Connections—basically, a collection of integrated HyperCard stacks and an INIT for managing alarms—is a combination daily planner, calendar, and telephone and address directory. The daily-planner module lets you post reminders, to-do items, and appointments, while a full-screen calendar provides an overview of the month. The telephone directory module offers autodialing and a Call History feature that lets you track telephone contact time. There's also a Personal Library module in which you can store letters, faxes, notes, and so on. The run-time version of Reports, included with the program, enables you to print excellent desktop and pocket directories, schedules, and other reports in several organizer formats.

Connections' strength lies in the fact that you can build direct links between entries in any of the various stacks. Once a link is in place, you can navigate between related entries with a single click. For example, you can select the name of a person to call on the to-do list, then click on the Directory icon and jump to the listing for that person in the directory. You also can navigate between the modules using a colorful, resizable Shortcut palette.

In version 2.1, dialog boxes for setting voice alarms and scheduling recurring appointments have been redesigned for easier use; a Begin Fax feature lets you create headings for faxes, using information stored in the directory; and a new Carry Over command lets you transfer reminders to a specified future date. For group use, Connections now offers full compatibility with AppleShare 3.0 and password storage for automatic log-on to group calendars.

Each of Connections' modules is graphically appealing, but they lack the kind of conveniences that give personal information managers their power. For example, you can't add an appointment or reminder while viewing the monthly calendar; you must switch back to the daily planner module to make any changes. Also, you can't remove an appointment or to-do item by selecting it and hitting the delete key; instead, you have to choose a delete command (there is no keyboard equivalent) from the Daily menu. And while the ability to create one-click links between entries in the modules is neat, the links take too long to build and execute.

Other features just don't function logically. A new Time Stamp feature lets you paste the current time and date into any editable field, but it's disabled when it would be most practical, such as when you're filling in the Completed date field on a to-do item. I also found it strange that if you assign a reminder a due date and then check the Post in Monthly box, the reminder gets listed twice on the calendar. If you assign a reminder a due date but opt *not* to post it in the monthly calendar, it inexplicably shows up on the calendar anyway.

But the biggest problem is that Connections' slow performance is barely tolerable. Ironically, Concentrix Technology claims the first thing you'll notice about version 2.1 is its improved speed; the first thing I noticed was the disappointing *lack* of speed improvement. Posting new appointments and reminders and shifting between the program's various modules still takes too long. I also had serious speed problems using the note-taking feature in the Personal Library module; the program lagged several words behind me when I was typing at average speed.

When Connections was first released last year, it was buggy. Problems persist in version 2.1. Most notably, Font menus in Connections can become jumbled if the system contains a combination of TrueType and Adobe Type 1 fonts. If you select a particular font, you may end up with the one listed below it on the menu. Another glitch I encountered involved the Begin Letter command, which uses information in the directory to type out the headings for correspondence; the return addresses on my letters were all improperly spaced and appeared along the wrong margin. (Technical support helped me edit the HyperTalk script to provide a temporary fix to the return-address problem.) Concentrix plans to provide an update that will fix the font problems.

Running Connections requires 1.2MB of RAM, and the full program—including HyperCard, the Alarms INIT, and the software needed to print the preformatted reports—takes up a sprawling 4MB on your hard drive. All in all, it's too big, too slow, and too sloppy to meet the challenge of performing as a personal information manager really should.
—JOSEPH SCHORR

Finder Utility

MasterFinder 1.2.1

PROS: Rapid access to frequently used files and folders; permits operations on several files at once; saves catalogs of offline volumes. **CONS:** Requires time to master; fixed-width window. **COMPANY:** Olduvai Corporation (305/665-4665). **REQUIRES:** Mac Plus; System 6.0.5. **LIST PRICE:** $149.

MW ★★★★

AS GOOD AS IT IS, THE MACINTOSH Finder comes up short when you have to manage thousands of files and folders on a huge hard drive or, worse yet, on a network. Simply finding files can be a chore, even using System 7's built-in Find command. Fortunately, third-party vendors offer a host of clever software designed to solve the Finder's deficiencies. MasterFinder, introduced in 1991 and since updated for System 7, is an ingenious solution, but one whose many features require some effort to learn.

MasterFinder comes in two forms—a desk accessory for System 6 users without MultiFinder, and as an application for System 7 users and for System 6 users running MultiFinder. A companion system extension that lets you shut down or restart the Macintosh from within MasterFinder is required for use with the application, but not the DA. I tested only the application version of MasterFinder for this review.

To get the most out of MasterFinder, the manual recommends that you set it to run automatically at start-up, so that it's always available (the suggested allocation is 340K). When it's running in the background, MasterFinder displays a miniature window that you can drag to any convenient location on the desktop; a single click brings MasterFinder to the foreground and zooms its window.

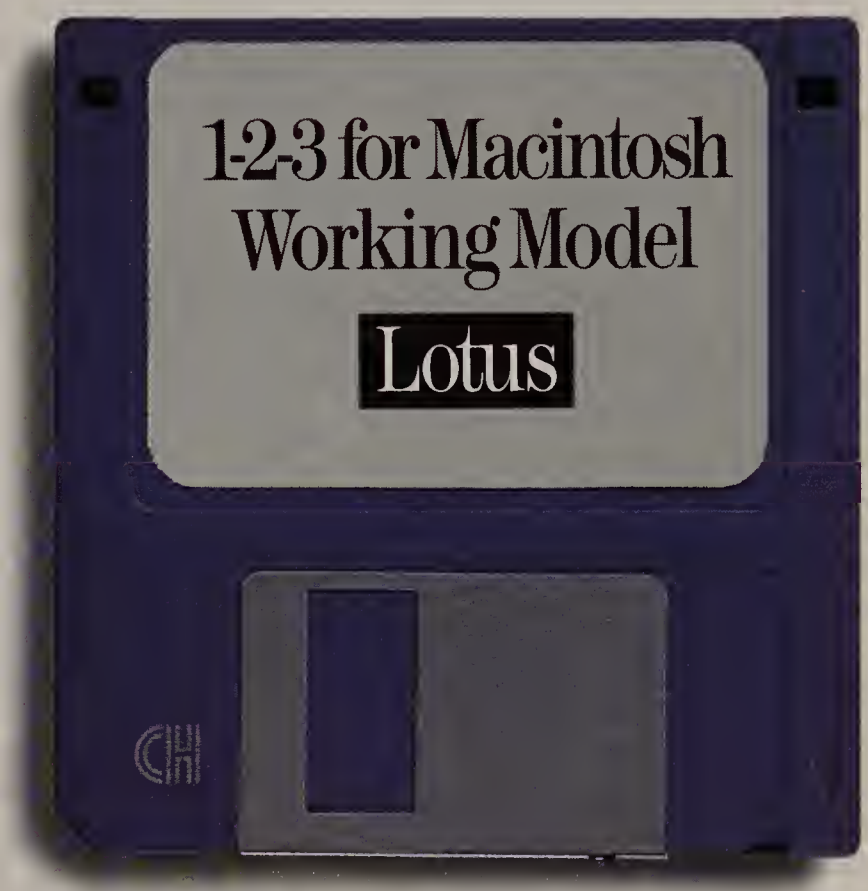
MasterFinder's main window is divided into four vertical sections called panes, each of which can display the contents of a folder or a disk (see "Great Panes"). In place of the customary Macintosh scroll bars, arrows at the bottom of the panes let you scroll up and down the lists of files and folders, which MasterFinder calls directories.

MasterFinder provides multiple options for choosing which directories to

continues

This side is for people who believe everything they read.

This side is for people who don't.



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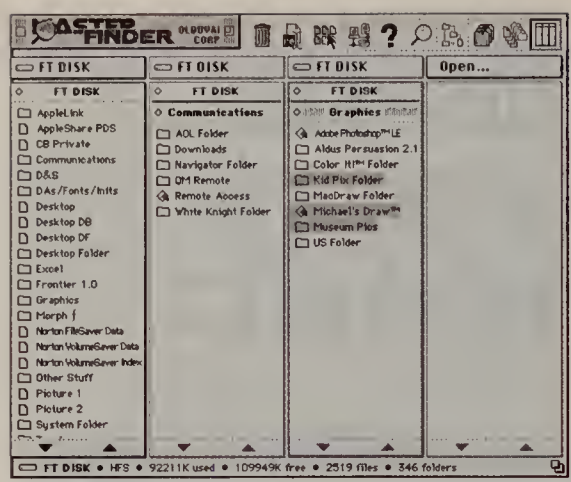

Great Panes MasterFinder's main window can display up to four directories at a time.

show. For example, you can view the contents of a folder by double-clicking on it or by dragging it into any free pane. Alternatively, you can open folders or volumes by selecting them from pop-up menus. (Like Now Software's Super Boomerang, MasterFinder automatically maintains a list of recently accessed folders.) MasterFinder's window is fixed horizontally, though, so you can't add new panes or widen the four standard panes to accommodate long file names.

As in the Finder, double-clicking on an application launches it, while double-clicking on a document launches the creating application if it's available. You can print selected documents and quit applications from within MasterFinder. Like other utilities, MasterFinder lets you view and edit attributes of selected files such as memory partition, file type, and creator. MasterFinder even lets you alter certain other esoteric file attributes, including some that determine how applications handle Apple events.

For the average user, MasterFinder's most potent feature is its ability to manipulate multiple files and folders at the same time. For example, you can move several files at once by selecting them and dragging them to another folder or volume. And it's just as easy to duplicate, rename, alias, or delete a group of files with a single command. Although you can do this with the Finder too, MasterFinder's panes make it much more convenient to shuffle through deeply nested directories to locate a destination folder or volume.

MasterFinder also incorporates a find command that lets you scan for files and folders by name, date, size, type, or creator. (You can't look for text within files, however.) In my head-to-head tests, MasterFinder was much speedier than System 7's Find command. Files and folders that meet your criteria are added to the bottom of a scrolling list, and frequently used search criteria can be saved for later use. Because the list isn't cleared until you say so, it's easy to combine the results of searches spanning multiple volumes. Found files and folders can be deleted, renamed, moved, or copied to another volume or folder, something that's hard to do using the Finder.

MasterFinder also incorporates a function that scans volumes and builds catalogs of their contents for later use. It's a handy way to keep track of files on high-capacity removable media like SyQuest cartridges and CD ROM drives. Catalogs can be searched using the same criteria as MasterFinder's regular Find command. Another handy MasterFinder feature enables networked users to display a list of the devices on up to four AppleTalk zones at a time.

With its less-than-intuitive interface, MasterFinder has a somewhat steep learning curve compared with some utilities. To make full use of MasterFinder's impressive suite of functions, you have to be willing to invest some time. When I finally read the manual carefully after playing around for a few days, I realized that I hadn't discovered most of MasterFinder's capabilities. After just one week, though, MasterFinder grew from a curious utility to a valuable asset, and I recommend it highly.—FRANKLIN N. TESSLER

Laser Printer

C. Itoh ProWriter Printer

PROS: Good manual-feed slot; paper tray is adjustable and can feed envelopes; resolution-enhancement feature. **CONS:** Can't print TrueType fonts; cumbersome setup; below-average laser output; poor documentation. **COMPANY:** C-Tech Electronics (714/833-1165). **LIST PRICE:** $2395; required Mac Pack kit $850.

MW ★★

NOT ONLY IS THE C. ITOH PROWriter more expensive than most personal page printers now available, it offers less-impressive features and so-so printed output.

To set up the printer, you have to install five pieces—cleaning pad, drum unit, drum counter, developer unit, and toner cartridge. The toner cartridge is messy, and before inserting the drum unit you have to clean the charger wire with a cotton swab (not provided).

Using the printer with a Mac means first installing the Mac Pack kit. This involves unscrewing the rear panel of the printer, removing the printer's serial and parallel ports, and replacing them with the AppleTalk interface. Then you have to pull out the main controller board to connect a PostScript-emulation board and an additional 1MB SIMM (all included in the Mac Pack). Finally, you must set the DIP switches on the controller board and put everything back together.

The ProWriter's Tec 1323D print engine is rated at 8 pages per minute and has an Intel 80960 RISC processor. The unit comes with 35 resident PostScript-compatible fonts from Bitstream, and a disk of screen fonts. A second paper tray ($175) and a 20-sheet output tray for the rear exit slot ($30) are also available.

The printer handled PostScript graphics adequately, but choked when handling text. Despite the printer's edge-enhancement technology, many fonts appeared unusually jagged and uneven.

Trying to print documents containing TrueType fonts consistently resulted in printing errors that completely froze up the printer. The printer's reset button never worked, and I had to repeatedly restart the printer to continue working.

Technical support was almost no help. One technician told me he had no information about the TrueType problem. I did learn that C-Tech is aware of a problem with TrueType compatibility and that an upgrade will be available around the beginning of 1993.

Overall, the construction is flimsy. The 16-character LCD display is dim. The eight buttons on the operation panel have a spongy, wobbly feel. And the lever that switches paper output from the top of the unit to the rear slot makes a disconcerting *sproinnnggg* whenever you flip it.

The documentation has a skimpy index, no technical-support number, vague instructions, and diagrams that are difficult to understand. The main manual doesn't acknowledge the existence of Macintosh computers, while the sparsely written AppleTalk supplement gives only sketchy instructions and ignores System 7 and TrueType. Some of the instructions are so poorly written, it's embarrassing.

To be fair, the printer has its positive features. The ProWriter's low, flat design—it's less than 9 inches tall—makes it less bulky than other printers. The adjustable 250-sheet paper tray can handle paper as narrow as 3 inches in width, and can feed envelopes, too. A translucent flip-up panel lets you refill it without removing the tray from the printer. And the paper tray also has adjustable guides for feeding pages into the printer manually.

Still, with the required AppleTalk option, this printer costs more than almost every other RISC-based personal page printer currently available. Given the ProWriter's TrueType troubles, lack of a true PostScript interpreter, poor documentation, and unimpressive output, it's clearly a printer to avoid.—JOSEPH SCHORR

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24-bit color with Ethernet networking built-in	ColorLink SX/T **$789**	None	None	None

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Document-Management Utility

DocuComp II 1.0

PROS: Valuable office function; maximum customization of options; full feature set. **CONS:** Only supports Microsoft Word and WordPerfect; busy technical support; interface not Mac-like. **COMPANY:** Advanced Software (408/733-0745). **REQUIRES:** Mac Plus; System 6.0. Recommended: Hard drive. **LIST PRICE:** $179.95.

MW ★★★

DOCUCOMP II COMPARES THE TEXT in two versions of the same file and then reports the differences in an exhaustive, easy-to-follow form. With this capability, you can impose version-control systems (avoiding tragic errors that occur when you laboriously fix a draft and then the unfixed version goes out instead). You can also speed up the editing process on long documents. Writers can get the new draft of a document with a comparison report, a printout showing the changes made to the prior version; this makes it easy to see which of the proposed changes were made, which weren't, and what other writers have suggested.

There are obvious applications for such version-control work: contracts, budgets, curriculum plans, books, reports, technical documentation—in fact, any document longer than a page or that needs multiple drafts. DocuComp works with Microsoft Word, WordPerfect, and text-only files; the program can also read no-format information files, a file format almost any application can save files to. (Users of Microsoft Word 3 and 4, WordPerfect 1.X, WriteNow 2.X, MacWrite II, and More should use DocuComp 1.5, which is still available.)

To use DocuComp, you launch it and indicate the old version and the new version of a file. You can specify a range of reading and reporting options. Execute the Compare function, and DocuComp, without affecting the original files, delivers the Comparison Window, a side-by-side view of the two documents with insertions, deletions, and moved text, each identified by color or font style.

There are a couple of limitations, however. First, you can't see any graphics in the Comparison Window, nor can you see any changes made to fonts or blank lines. In addition, the Comparison Window is not itself a document. If you want to save the changes in a composite document for later use, you have to save a separate Comparison Report. This isn't difficult, but the process is neither intuitive nor particularly Mac-like.

DocuComp bristles with customization options; if you're a beginner at editing, you can use the default formatting options to get good results. The sole exception is in the comparison of text-only files, for which you need to describe some optional choices. The software supports all the traditional document-comparison symbols: bars next to lines that have changes in them, strike-outs for deleted text, underlining of additions, brackets to indicate a choice of two words.

The documentation is an intelligently written guide to organizing your work to make version control easier. It has a good index, and it points out the product features that seem least obvious.

Technical support is a question mark. Three different calls on different days at different times all yielded busy signals.

DocuComp II has some new features: the saved composite document retains font, style, and tabular elements. Other options include footnote handling and assignment of file type to saved files. The new version runs under System 7.0 and supports balloon help.

DocuComp II is a full-featured utility for comparing documents. While its performance is good, the interface is specialized enough that I recommend it for people who will use it at least monthly. It is an indispensable tool for any editor. And if you want to set up a serious document-management program, or if you just need to sort out versions of documents fairly regularly, DocuComp II is an effective way to go.

—JEFFREY GORDON ANGUS

Font-Design Software

Fontographer 3.5

PROS: Excellent freehand drawing tool; good walkthroughs in manuals. **CONS:** Not intuitive; renaming fonts is complicated. **COMPANY:** Altsys Corporation (214/680-2060). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive. **LIST PRICE:** $495.

MW ★★★★

FONTOGRAPHER PROVIDES VERSATile tools for editing PostScript fonts and creating characters or entire typefaces of your own. It also includes utilities for editing kerning tables; adjusting character widths; converting fonts into various formats for use on Mac, DOS, and Next computers; and remapping characters to different places on the keyboard. (Version 3.51, available free on most online services, fixes the copy and paste problem found when using the background layer.)

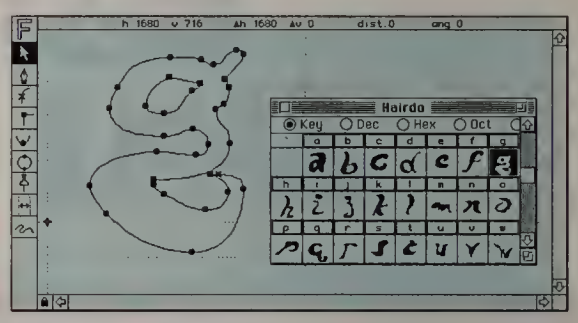
You can create fonts four ways in Fontographer: modify an existing font, scan roughs into the program and then refine the characters, start with an existing Aldus FreeHand or Adobe Illustrator file and modify it, or draw your own characters from scratch with version 3.5's new freehand tool.

For freehand work, you can choose one of three drawing tools—a line tool, a variable-weight pen, or a calligraphy pen. As with any PostScript draw program, you can control fill patterns, line weight, the way each line ends, and the way strokes meet. The program also has an excellent autotrace function, and you can paste in PostScript outlines from FreeHand and Illustrator.

Fontographer 3.5 works well with pressure-sensitive tablets, so you can draw in a more natural way with a stylus instead of a mouse. If you don't have a tablet, you can adjust line weights with the arrow keys as you draw with the mouse.

Using the freehand tool, I drew a simple font in less than ten minutes. (It takes longer to make precise characters.) With a single command Fontographer can turn the finished characters into printer and screen fonts. (Have a good name ready, though; renaming is tricky.) Once you've created a font, you can modify it to generate others, such as expanded and condensed versions.

If you want more control creating or modifying fonts, you can use Fontographer's expert features—Hinting, Multiple Masters, and Interpolation. Font interpolation mathematically calculates a font from two source fonts. You choose the source fonts and then specify how much of each font's characteristics you want the new one to inherit. If you start with roman and boldface source fonts, for example, entering 50 percent as a weight value produces a semibold font. Hinting improves how consistently a font displays in various sizes. Normally Fontographer automatically calculates the hinting. In expert mode, you can customize it, but the process is technical and cumbersome.



Freehand Tool You can use the new freehand drawing tool to draw a font directly on screen.

Fontographer 3.5 also edits and creates Multiple Master fonts. This new format, from Adobe Systems, lets the people who design fonts give the people who use those fonts a limited ability to devise their own variations. In Fontographer, the designer decides whether users can change character weight or width and sets the limits for changes. For example, the font may come in weights from extra light to extra bold, but the Multiple Master font you design could exclude the heavy and light extremes.

With its advanced tools and access to the latest in font technology, Fontographer is an essential tool for experts who produce professional fonts.—JO ANN VILLALOBOS

MACWORLD
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Circle 303 on reader service card

Multimedia Speakers

ACS300 Computer Speaker System

PROS: Big, rich sound; separate subwoofer; no distortion, even at high volumes; handles two audio inputs simultaneously. **CONS:** Nonstandard cabling; maximum 6½ feet between components; ambiguous controls; no on/off switch. **COMPANY:** Altec Lansing Consumer Products (717/296-4434). **REQUIRES:** Mac Plus; System 6.0.5; CD ROM drive or other audio source with standard miniplug audio-output jack. **LIST PRICE:** $400.

MW ★★★

IF YOU NEED TO REPRODUCE HIGH-fidelity Mac and CD ROM sound for music or multimedia presentations, consider the self-powered ACS300 speaker system from Altec Lansing, creator of the ear-splitting Voice of the Theatre speakers that loom large at rock concerts. At the other end of the size scale, the ACS300 consists of two compact clamshell-shape high/midrange speakers that can stand on a tabletop, hang from a wall, or attach to a monitor; a subwoofer; and a power supply. The components are all solidly constructed; the speakers are shielded to prevent interference with the Mac.

The ACS300 handles audio input from two sources at once—the Mac and the headphone jack of a CD ROM drive. You mix the two sources by turning a knob on one of the speakers. Five other knobs control volume, left-right balance, bass, treble, and the digital signal processing that Altec says simulates stereo from mono input. (I didn't test the effect on a mono signal, but turning the knob to one extreme did make it sound as if the speakers were much farther apart than they were.) Too bad it's hard to tell which way the knobs point.

Setup requires reading a manual and plugging in six cables. The ACS300's cables are specially designed (with miniplug connectors rather than RCA jacks), so you can't just go to Radio Shack for a replacement if you lose one. And Altec makes only one length of cable so far; at 6½ feet, it is long enough for workstations but may be too short for some trade shows and demonstrations. The system also lacks an on/off switch; Altec said this is because most users plug into a surge suppressor that has a power switch.

On the system I tested, the clamshells' connectors were loose, causing noise when the speakers were jostled. Plugging or unplugging the speakers into the wall also created a loud, jarring sound. Altec has redesigned the connectors and improved muting to fix both problems; the company will repair existing models for free.

ROBERT PERRY

Altec Lansing's ACS300 Computer Speaker System

The ultimate test of any loudspeaker is its sound. The ACS300 system is very nice to listen to, and the subwoofer gives richness usually missing from portable speakers. Low piano notes on digital recording were amazingly clear and realistic; yet the speakers handled high-volume rock 'n' roll without distortion. In comparison, the self-powered Bose RoomMate speakers seemed more clearly defined in the highs and midrange, while the Altecs were richer and smoother.

For presentations, the ACS300 can be played impressively loud, but the ACS300's 6½-foot-long specialized cables may be a problem for work on the road. In any case, Altec Lansing's ACS300 speaker system is well worth a listen.—BILL JUSTIN

Grammar Checker

Sensible Grammar 2.1.3

PROS: Fast; easy to use; excellent interface; editable rule sets. **CONS:** Offers invalid recommendations; does not catch misspellings. **COMPANY:** Sensible Software (313/774-7215). **REQUIRES:** Mac Plus; System 4.2; hard drive. **LIST PRICE:** $99.95.

MW ★★

GRAMMAR CHECKERS ARE INHERently limited. They cannot truly read and comprehend writing (yet), so they rely on a technique of comparing sentences to a table of English grammar rules. They are all prone to making illogical, inappropriate recommendations. Sensible Grammar is no exception in this regard; but it is fast, has a well-designed interface, and gives you a variety of writing styles, each with a customizable library of rules.

Sensible Grammar works with most popular word processing programs, and with Aldus PageMaker and Microsoft Works. If you're using System 7 or MultiFinder, Sensible Grammar adds a handy Grammar menu to the menu bar of any of the supported applications you choose in Sensible Grammar's control panel.

You can use Sensible Grammar in three ways. Within an application, you can check either an entire document or a portion, approving or rejecting recommended changes; Sensible Grammar preserves your formatting. You can also have Sensible Grammar check text copied to the Clipboard, although in some applications copying to the Clipboard undoes a document's formatting. Finally, you can open and check documents from within Sensible Grammar.

The upper portion of the Sensible Grammar window shows the word, phrase, or punctuation in question and a definition of the problem. The previous sentence, for example, warranted "Overly formal phrase: portion." Below this, Sensible Grammar makes recommendations—in this case, that I change *portion* to *part*. The questionable word or phrase appears in context in a window to the right. You can highlight a suggestion and click on the Correct button to change your text accordingly, or type directly in the text box to rewrite the phrase. If Sensible Grammar's suggestion is wrong, or you just want to skip it, click on Ignore. Clicking on the Mark button surrounds the word or phrase with symbols (which you select, such as << and >>), so you can easily return to it later. By clicking on the Log Error button, you can create a text-file record of errors. A progress gauge shows how much of the document has been checked.

When you've finished checking a document, Sensible Grammar displays a readability report showing the level of difficulty and a human-interest rating from "dull" to "dramatic," as well as the number of words, sentences, average syllables per word, and average words per sentence.

Like most grammar checkers for the Mac, Sensible Grammar lets you choose the style of writing you're checking—academic, business, common, informal, legal, technical, and two kinds of personal style. You can customize each style by activating or deactivating various grammar rules to have Sensible Grammar watch for sexist language and passive voice, for example, or to permit contractions. However, unlike stand-alone applications such as Wordstar's Correct Grammar and Reference Software's Grammatik Mac, and the Microsoft Word built-in grammar checker, Sensible Grammar does not catch spelling errors. If you fail to run a spelling checker before using Sensible Grammar, it may skip over grammatical, as well as spelling, errors—a point the manual fails to mention.

As with any grammar checker, the writer must consider every recommendation carefully. Along with the many incorrect and unusable recommendations Sensible Grammar offered up were a few pointers that helped me give my prose a little polish.
—JOE HUTSKO

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Circle 139 on reader service card

Hard Drive Security Utility

NightWatch II 2.0.1b

PROS: Multiuser accessibility; flexible; does not encrypt hard drive data. **CONS:** Screen saver disables After Dark; manual system restart overrides screen locking and disables disk locking. **COMPANY:** Kent Marsh (713/522-5625). **REQUIRES:** Mac 512KE; hard drive; System 6.0.5. **LIST PRICE:** $159.95.

MW ★★★

DID YOU EVER WAKE UP IN A HORrified daze from one of those nightmares where you forgot to wear your clothes to work or school? At some point most Macintosh users wake up and realize that their invaluable hard drives are left in this precarious state of nakedness every day. NightWatch II provides a flexible and safe method to restrict access to your hard drive. Unfortunately, NightWatch allows crafty snoops to override some of its features and invade your private space.

You install NightWatch II in one of three ways: Diskless, Classic, or Passwordless. What differentiates these three versions are the requirements for access. For Diskless you need only a user name and a password at start-up; Classic requires a key disk in addition to the name and password; and Passwordless requires only a key disk with no password protection. I found Diskless easiest to install; but Classic provides an added level of security, requiring both a disk and the password. I wouldn't recommend Passwordless because anyone with your key disk can access your drive easily.

Installation also involves setting up a database of people who will have access to your data, including you. You enter the name and assign a password. Additionally, you can specify what days of the week and times in the day a particular person has access to your drive. It is this multiple-user approach that makes NightWatch II stand out among its competitors. Most others offer only a single-password or global-access approach. Another plus is that NightWatch II does not use data encryption as its form of protection. With most other disk-locking utilities, your data is encrypted and is only decrypted when you unlock the disk; if you forget your password or your hard drive crashes, you can kiss your data good-bye.

All three NightWatch versions provide security in two forms. The first happens when you shut down the system via the Special menu or a NightWatch II utility. This locks the drive (restarting does not lock the drive). When you start the Mac, a dialog box asks for your user name and password. The second form of security is a screen locker. This is an INIT/extension that causes one of several hokey (aerobic tomato?) screen saveresque screens to appear when the Mac is inactive for a period of time. Entering your name and password unlocks the screen. NightWatch is not currently compatible with After Dark and will freeze your After Dark screen (sorry, Lunatic Fringe fans).

Unfortunately, using System 7, I was able to override the screen locker by manually restarting the Mac (via the programmer switch) and holding down the shift key. With System 6 I was able to do the same but had to insert a system floppy to override the screen locker. This is detrimental for a couple of reasons. First, overriding the screen locker allows complete access to the hard drive. Second, it doesn't lock the hard drive because restarting isn't a genuine shutdown. This can be a major problem or a minor one, depending on your vigilance. The bottom line is that you must perform a shutdown whenever you leave your Mac; the screen locker is not secure enough. Someone at Kent Marsh explained that correcting this problem could mean causing damage to your hard drive by constantly locking your hard drive in the background rather than just at shutdown.

Disk-locking utilities are risky at best. Kent Marsh has done a great job creating one that's safe to use and provides a decent level of security.—MATTHEW R. CLARK

Text-Searching Utility

Retrieve It 1.0

PROS: Searches for file names as well as text; no indexing required. **CONS:** Slower than indexed searching; limited file filters. **COMPANY:** MVP Software (415/599-2704). **REQUIRES:** Mac Plus; System 6.0.4. **LIST PRICE:** $129.

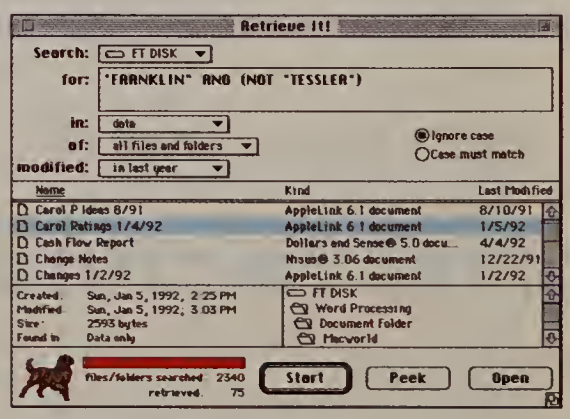
MW ★★★

RETRIEVE IT IS A DA DESIGNED to locate files whose names or contents include designated strings of text. You can set up complex search criteria with Boolean operators (Sally OR Phil AND NOT Oprah), and you can stipulate how far apart two text strings have to be for a match to occur. Searches can be case-sensitive or not.

To minimize search times, Retrieve It lets you restrict scans to a single folder, or to files modified within a specified time period. Searches also can be limited to documents created by any one program; you select the application from a list that Retrieve It generates for you. (Applications compressed using Salient's AutoDouble or DiskDoubler are excluded from the list. Retrieve It can find text inside files compressed by AutoDoubler, but only if you search "all files and folders" or "DDExpand files"—not if you search by the file's original creator name.) You can also search only the data or the resource forks of files.

As Retrieve It scans, it gives you a scrolling list of the names, types, and modification dates of files that meet your search criteria. Retrieve It lets you move selected files to the desktop, but you can't copy, delete, or otherwise manipulate them. Double-clicking on a file in Retrieve It's list lets you peek at its contents in a separate window. To improve the readability of files with embedded formatting information or graphics, Retrieve It allows you to remove formatting characters from the text display. You can also have Retrieve It open a document by launching the application that created it.

I compared Retrieve It with two other text-retrieval utilities, Microlytics' Gofer 2.0 and On Technology's On Location 2.0 (see *Reviews*, *Macworld*, June 1992). As I expected, Retrieve It was much slower than On Location when scanning for text within files. The first time you use On Location, you must index all your volumes; after that On Location does an excellent job of updating indexes in the background. Because On Location searches just these indexes, not all your files, it's faster at locating text strings than Gofer and Retrieve It are. On Location was also faster than Retrieve It when searching for file names, but by a much smaller margin. File for file, Retrieve It was usually a bit faster than Gofer at text searches. But judicious use of Gofer's more-flexible search options, which let you create lists of file types to scan or exclude, made Gofer faster than Retrieve It in some cases.



Hunting for Text Files found by Retrieve It can be sorted by name, kind, or modification date.

For daily use, I prefer On Location because of its speed, its ability to view formatted text, and its built-in file utilities. But DA's like Gofer and Retrieve It are useful when you need to search floppies or other removable media where indexing may be impractical. Each utility has its strong points. For example, Gofer lets you copy noncontiguous selections to the Clipboard, while Retrieve It lets you search by file name. A DA combining the best features of Gofer and Retrieve It would quickly find a place alongside On Location in my Apple menu.—FRANKLIN N. TESSLER

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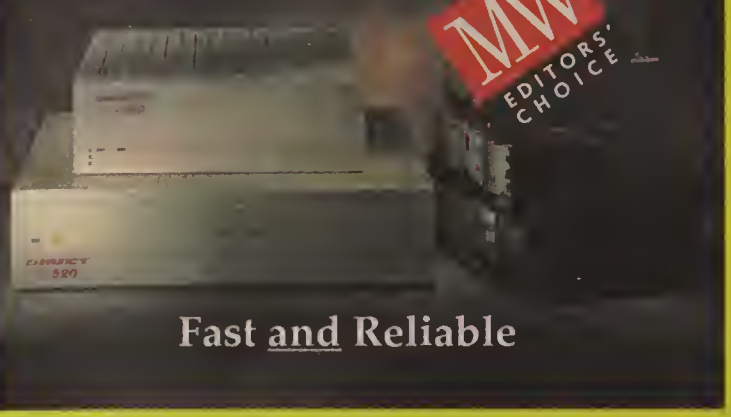

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C 120 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	$348	$438
C 170 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	$428	$498

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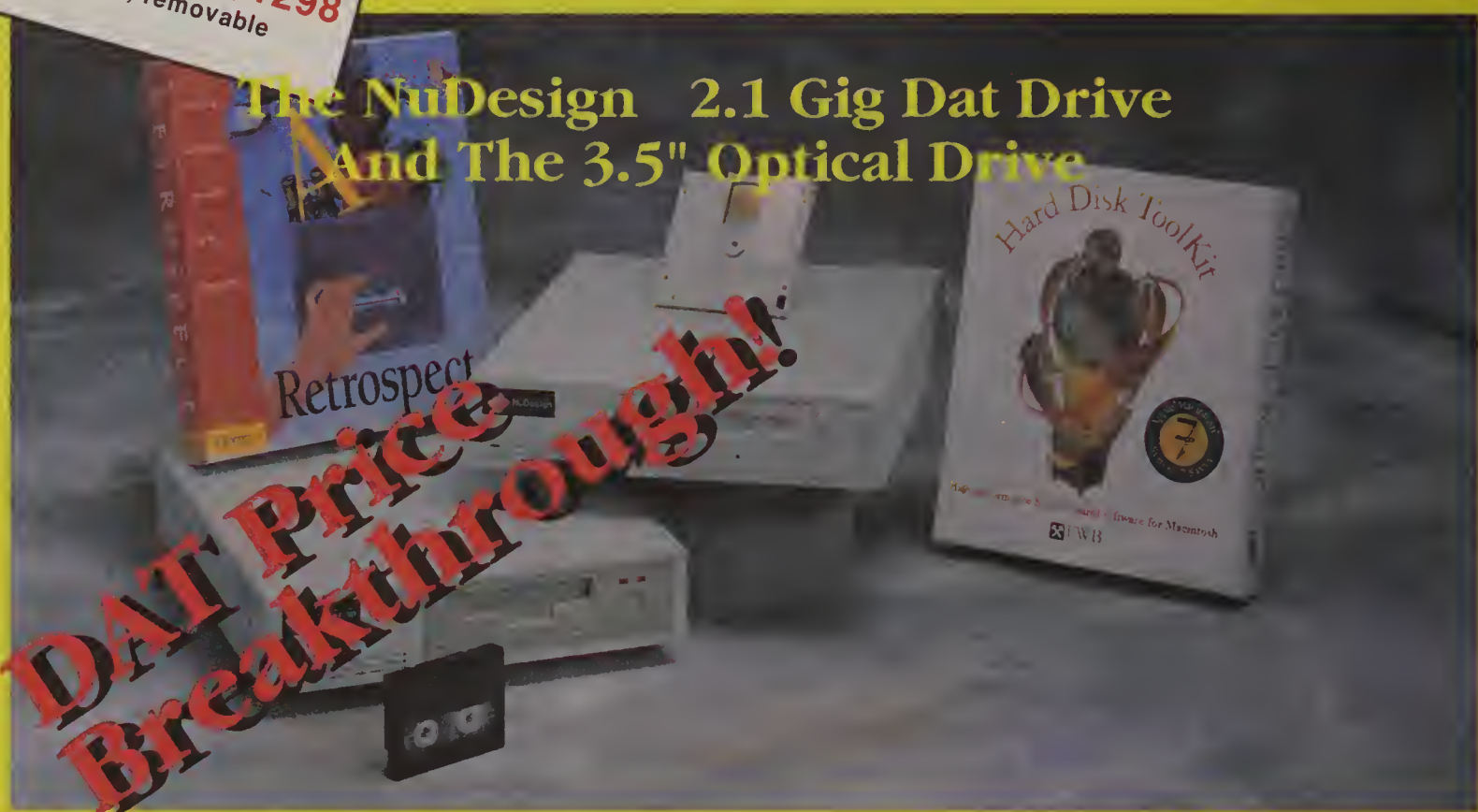

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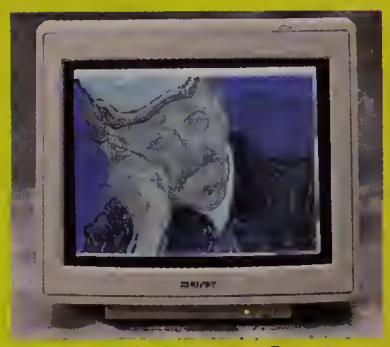

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Circle 58 on reader service card

On-Screen Presentation Enhancer

Smoothie 1.02

PROS: Converts presentations into antialiased screen shows; can display fonts on Macs where they're not installed. **CONS:** Can't play sounds; can't convert from QuickTime format. **COMPANY:** Peirce Software (408/244-6554). **REQUIRES:** Mac II; 2MB of RAM; color monitor; System 7.0; System 6.0.2 and 32-bit QuickDraw for run-time playback. **LIST PRICE:** $149.

MW ★★★★

SMOOTHIE ANTIALIASES THE EDGES of artwork to create smooth screen images. If this sounds like Ray Dream's JAG (Jaggies Are Gone), you haven't heard the whole story. Unlike JAG, which opens and softens only bitmapped graphics, Smoothie resolves objects, such as those created in animation and presentation programs, and returns a bitmapped screen image.

Say you've created a presentation using Aldus Persuasion, CA-Cricket Presents, or Microsoft PowerPoint. You want to play it from your Mac screen using a projection device or distribute it to other users to play on their screens. Unfortunately, a presentation program's object-oriented text and graphics look best when output to overheads or slides. Text and graphics alike appear jagged when displayed on screen.

Enter Smoothie. First you must save the presentation to the Scrapbook. When you open the Scrapbook in Smoothie, it antialiases all the object-oriented graphics it finds. (If it encounters an item it can't interpret—sounds or ASCII text—it stops.) Smoothie then saves the sequence of images to a separate Scrapbook file, letting you embellish the presentation in any program that supports the Scrapbook format (PowerPoint doesn't).

You can also save the antialiased presentation as a QuickTime movie or as a run-time screen show, especially useful for distributing presentations on disk. When users launch the self-running screen show, Smoothie greets them with a three-line message of your making and a choice of Run, Options, Help, and Quit buttons. Options gives the viewer a choice of presentation speeds—by default, a new slide every 10 seconds—or lets the viewer manually advance through the screen show. Since Smoothie converts text to bitmaps, you don't have to wonder whether viewers have the same fonts you've chosen or Adobe Type Manager. All fonts display exactly as they do on your Mac, so you can use whatever typefaces you like. In fact, the only requirement for viewers is that they use System 6.0.2 and 32-bit QuickDraw. This way, even if you create a presentation on a 24-bit monitor, it looks OK on an 8-bit or 4-bit screen.

From Mottled to Model Smoothie converts object-oriented slides (top) to smooth screen images.

Unfortunately, the run-time feature can't accommodate sound, as Persuasion and Cinemation do. And while Smoothie can export titles and other still screens to the QuickTime format, it can't import a QuickTime movie. Nor can a run-time screen show play a QuickTime movie from disk; if you want to integrate slides and movies into the same presentation, you have to export the slides in QuickTime format and use a different playback utility. Even so, Smoothie is indisputably a fine utility, a must for anyone producing run-time screen shows.
—DEKE McCLELLAND

CD ROM–Access Accelerator

SpeedyCD 1.2.2

PROS: Well-designed interface; good manual. **CONS:** Requires a lot of time and hard drive space to build its files; does not support High Sierra or ISO 9660 CD ROMs. **COMPANY:** ShirtPocket Software (602/966-7667). **REQUIRES:** Mac Plus; hard drive; CD ROM drive; System 6.0. **LIST PRICE:** $70.

MW ★★★

NOWADAYS IT SEEMS PEOPLE ARE flocking to CD ROMs. Compact discs are relatively cheap and can hold hundreds and hundreds of megabytes' worth of data. But people are often disappointed to find that CD ROMs are turtles. The transfer rates are low, meaning data reads relatively slowly from the CD into RAM; and access times are slow, meaning CD ROM drives are relatively slow to locate data on discs. SpeedyCD, a control panel device from ShirtPocket Software, addresses just the access-time problem by making a directory of all files on a CD and storing it on the startup volume. This effectively enables the CD to take advantage of the speedier access times of hard drives.

I expected to find that only the procedures that require frequent access to the file directory—operations such as Get Info and Find File—would show improvement. That is because these operations move the read-write head between the directory tracks to the data tracks in use. That file-system overhead is the time-glutton with CD ROMs.

To check my hypothesis I ran two tests. In the first, I opened a series of graphics and text files on the CD; in the second test, I performed a bunch of Get Info operations. My results showed that files on the CD ROM open no faster with SpeedyCD than without it because there's not much file-system overhead involved, usually just a single access. On the other hand, SpeedyCD improved speeds significantly in the Get Info test. Without SpeedyCD, the Finder took 103.12 seconds to perform a Get Info operation on a 350MB folder containing 3699 files and subfolders; with SpeedyCD it took only 14.93 seconds. Folders also opened faster with the utility installed, but because folders on CDs open fairly quickly anyway, the difference was not as noticeable.

Setting up the directory files on the hard drive takes some time and disk space. On a Macintosh IIci running System 7, SpeedyCD built its directory files for a 568MB CD ROM (10,685 files and folders) in 27 seconds and used 2.5MB of hard drive space to save the directory databases. CD ROMs with less data require less time and space. Slower CPUs take longer to process the directories.

Because its directories are stored on the hard drive, SpeedyCD also lets you reorganize folders and files on the CD—something you ordinarily cannot do. SpeedyCD's databases remember where the files actually are on the CD ROM, but let you arrange the directories as you like. I generally don't refer repeatedly to the same set of CDs, and so the ability to reorganize the files and folders on them is not particularly useful (and besides, I don't have the hard drive space to store all the databases for many CDs). In addition, many large reference collections on CD include their own fast browser utilities. On the other hand, operators of bulletin-board systems and school computer centers might find SpeedyCD very useful for organizing data for their users.

SpeedyCD has a great interface, all the right features, and a good manual (with a QuickStart card that says it all in two pages). Is it worth $70 to you? That depends. If you browse CD ROMs only briefly, or use CD ROMs that have their own internal navigation systems, SpeedyCD's advantages are probably not worth the extra time and space it requires to build its files. But if you regularly browse through CD folders, especially if you use the same materials frequently, the investment can save you a lot of time.
—TIM WARNER

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Circle 143 on reader service card

Expert Systems Software

Entrypaq 1.0

PROS: Sophisticated for its size and price; provides good introduction to expert systems; implementations portable to DOS machines. **CONS:** Slow; HyperCard-based; difficult to construct usable user interfaces. **COMPANY:** Albathion Software (415/824-5704). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0. **LIST PRICE:** $149.95; training pack $179.95.

MW ★★★★

EXPERT SYSTEMS AIM TO CAPTURE the specialized knowledge (facts and rules) of one or more people (experts) and store it in a database, or *knowledge base*. Nonexperts can then use that knowledge base to solve problems as the experts would. Programs that do all this are called expert-system shells. Albathion Software's Entrypaq for the Macintosh is a low-end demonstration shell designed to teach you about expert systems by presenting working examples and by letting you build your own functioning knowledge bases.

Entrypaq includes a HyperCard-based expert shell for building and running simple knowledge bases, several example stacks containing working expert systems, and a reference manual. The training pack version includes a comprehensive, 400-page textbook, *Developing Expert Systems* (John Wiley & Sons, 1990). The book provides an introduction to expert-systems theory, practical instruction on building a working expert system, and a survey of current expert-systems technology. Entrypaq's reference manual complements the text nicely, describing the detailed operation of Entrypaq without delving into expert-systems theory or construction. Although you need no prior background in expert systems to understand the text or use the software, expect to put in a fair amount of time absorbing theory before you jump in and build your own knowledge base.

The program consists of a HyperCard template stack, augmented with specialized internal programming, that lets you construct a knowledge base of rules and unstructured facts. Entrypaq automatically clones the template stack when you create a new knowledge base. After you build the knowledge base, you use Entrypaq's built-in inference engine to run it. The inference engine accepts new facts about a target problem and integrates those facts with the knowledge base to produce "advice." The stored rules test facts input by the user and generate intermediate conclusions, which then become the input to subsequent tests that produce further conclusions. The inference engine follows a chain of such tests to arrive at one or more conclusions.

The textbook example is an expert system that diagnoses problems in a beverage-canning production line. The rules cover situations that plant experts know cause problems, such as "IF the tank has a pressure buildup THEN the tank needs maintenance immediately" and "IF a component needs maintenance immediately AND the component is a critical component THEN the canning line needs shutdown immediately." One of Entrypaq's sample stacks is a complete implementation of this system.

Entrypaq's rule processor and inference engine are implemented in HyperTalk, with complete source code supplied. Albathion also provides Entrypaq in a DOS PC implementation, based on the HyperCard clone Plus. You can export all or part of a knowledge base to a different knowledge base on either the Mac or DOS PC; Macintosh-based pictures and custom commands don't transfer, however. You can also compile a knowledge base to significantly speed execution, although even after compiling, Entrypaq is much slower than more-expensive expert shells.

Slow performance and the HyperCard user interface rule out Entrypaq for practical expert-systems implementation. However, Entrypaq offers an excellent, inexpensive introduction.—MEL BECKMAN

Unix-Based Operating System

A/UX 3.0

PROS: System 7 compatible; QuickTime support; Quadra support; includes X Windows; simplified installation. **CONS:** Complex; slow by Unix workstation standards. **COMPANY:** Apple Computer (408/996-1010). **REQUIRES:** Mac II with PMMU chips; 8MB of RAM; 80MB hard drive. **LIST PRICE:** $709.

MW ★★★

BACK WHEN STEVEN JOBS WAS still in high school and the first mouse had yet to be born at SRI, computer scientists at AT&T's Bell Laboratories invented a language called C and an operating system called Unix. Unix offered well-designed multiuser capabilities and a huge range of useful utilities built into the operating system itself, rather than into the applications, and it's fair to characterize early PC operating systems (MS-DOS, for example) as pitifully underpowered subsets of Unix.

Unix is so popular on networked minicomputers and workstations in universities and research institutes (it's never been quite so significant in business) that Apple is obliged to offer a version. The challenge is daunting, since the Mac is the best current example of a graphical interface, and traditional Unix has a Stone Age, type-one-line-at-a-time text interface. A/UX 3.0 finally gets the Unix/Mac combination right.

If you have the right hardware (more on that later), and have A/UX installed, you can set up one disk partition for Unix activities and another for Mac files and switch back and forth between them effortlessly. I wrote a package of C files in Symantec's Think C, saved them as text, and then opened them in the A/UX Text Editor and compiled them in the A/UX C compiler. A/UX's true multitasking lets you open several Mac applications and have them running in the background as you log on to a network using standard Unix communications protocols (TCP/IP, UUCP, and now CSL/IP).

Basically, A/UX 3.0 has all the features of the 1992 standard Unix (AT&T System V, Release 2, Version 2; and Berkeley Software Distribution versions 4.2 and 4.3) running in command windows on the Mac desktop. Apple has even provided a dialog-driven system called Commando that lets you assemble a Unix command using a dialog box instead of remembering some of the intricacies of Unix syntax.

The right hardware, according to many users, is a Quadra 950 with at least 12MB of RAM and a 400MB hard drive; I used a Quadra 700 with an 80MB hard drive only with some difficulty. A/UX 3.0 is compatible with a much larger array of Apple hardware than earlier versions were—scanners, 21-inch displays, LaserWriters IIf and IIg, and CD ROMs. The CD ROM is responsible for a dramatic improvement in installing A/UX. Even on a 950, please note, A/UX is slow—three times slower than Unix on a midrange Sun workstation.

Unix is huge, including networking, accounting and administration software for networks, text processing, languages (not just C, but BASIC, FORTRAN, and even a version of SNOBOL). A/UX is even larger, including all this; the Command Shell system; the Commando feature for constructing Unix commands through dialog boxes; and the X Windows, MacX, and X11 systems. So A/UX is now installed from a CD ROM, with a slick installation protocol directed by a few mouse-clicks. An installation with most but not all A/UX files on the Quadra 700 took 80 minutes and 55MB of hard drive space.

If you need Unix capabilities and have hardware that can accommodate the demands of this very large operating system, you will find A/UX 3.0 easy to install and easy to use. Apple has done a good job of addressing the performance issues inherent in this hybrid-operating-system package and has done an excellent job of creating a Unix implementation a Macintosh user could actually like.—CHARLES SEITER

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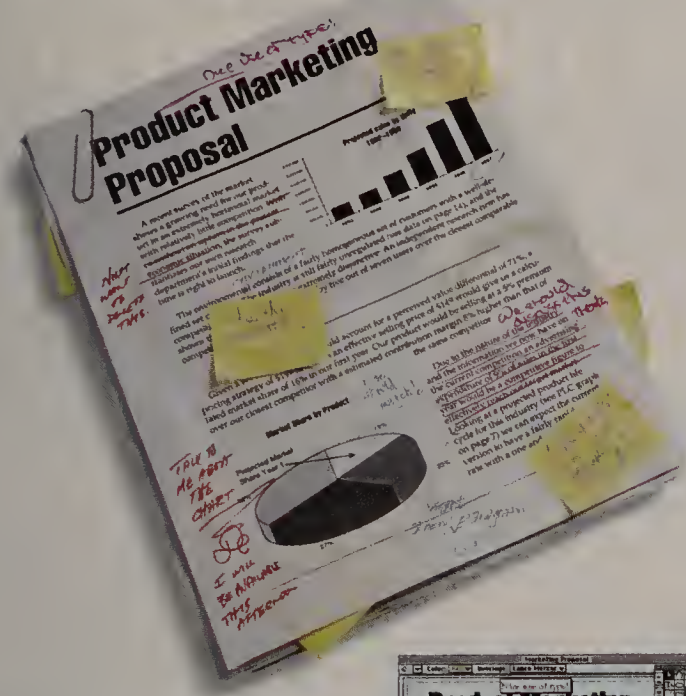

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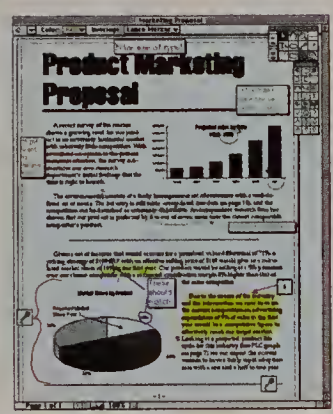

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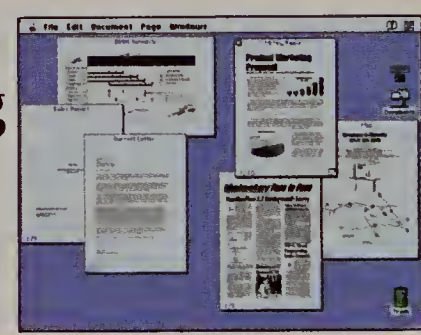

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Language That Teaches Programming

EdScheme 3.4

PROS: Designed to teach painlessly; provides excellent error messages; enables user to create Mac-like programs. **CONS:** Can't be used to create stand-alone applications. **COMPANY:** Schemers (305/776-7376). **REQUIRES:** Mac Plus; System 6.0.4. **LIST PRICE:** EdScheme $49.95; *The Schemer's Guide* $29.95.

MW ★★★

SCHEME, A DIALECT OF THE VENerable LISP programming language, is designed to teach programming concepts to beginners. To the structure of LISP, Scheme's designers added a flexible lambda calculus, technical refinements from Algol, and turtle graphics from Logo. Many high schools and universities teach Scheme as a first programming language; some use it as an artificial-intelligence programming language. Scheme is clear and elegant, and it makes programming fun to learn. It forces students to think about computation and to develop good programming techniques. EdScheme, from Schemers, is a Scheme interpreter for the Macintosh—an excellent implementation.

In Scheme you construct programs experimentally, piece by piece. First, you write some code, then test-run it a couple of times, and then you write some more. Gradually a complete program emerges. Programming that way in an environment as friendly as EdScheme is not only educational, it's downright enjoyable.

The company targets EdScheme for the beginning programmer; for example, it uses different colors to indicate different expression categories. The Mac-like editor even suggests proper indentation and helps you keep track of which nested parenthetical statement you're in (that's an innovation I would have loved when I first learned LISP ten years ago). The comprehensive error messages teach students what they did wrong. And turtle graphics make it easy to write interesting Scheme programs right from the start.

EdScheme couples power with its ease of use. It includes 64-bit floating-point arithmetic, the ability to extend the language's syntax through macros, and a complete set of file-handling facilities. EdScheme also has support for advanced programming techniques such as delayed evaluation, streams, continuations, and environments. Schemers' excellent reference guide explains all these features thoroughly. The language doesn't support the entire Macintosh Toolbox, but instead includes the basic elements a beginning programmer is most likely to need. The only thing I miss is the ability to create stand-alone applications.

Nevertheless, it would be a mistake to label EdScheme a toy language. The program comes with source code for a game that makes use of windows, dialog boxes, menus, icons, and graphics—it's very nearly a full-fledged Macintosh application. And you can look at, and learn from, the code.

The version I tested, EdScheme 3.4, implements a subset of the standard Scheme. The publisher says that version 4.0, which is expected to ship in the fall of 1992, will be 100 percent compliant with the standard.

EdScheme can run from a single floppy drive. In a school environment, where low-end Macintoshes outnumber the fully loaded models, this is a good feature. In addition to the reference guide, you can buy a companion textbook, *The Schemer's Guide* (Schemers, 1990; $29.95). The book is written for classroom use, but you can use it to teach yourself programming. The whole package costs only $80. It's a bargain that will give a budding programmer a good introduction to the field. The arcane art of C++ is better learned from a foundation of good programming techniques; EdScheme is an excellent tool for learning those techniques.—BRUCE SCHNEIER

Professional Office-Management Software

Office Wiz 1.1

PROS: Several users can work on common cases and share calendar and case-status information. **CONS:** Single-user version is overkill; lengthy setup time and steep learning curve; overpriced. **COMPANY:** Oryx Associates (415/563-9971). **REQUIRES:** Mac LC; 4MB of RAM; hard drive; System 6.0. **LIST PRICE:** $695; multiuser version $1495.

MW ★★

OFFICE WIZ 1.1 IS A 4TH DIMENsion–based program for managing tasks, calendars, accounts, and time sheets for a service-oriented company. It comes with a sample data file geared toward a law office, along with a more generic data file for other types of users. Although adaptable, the program is clearly designed with attorneys in mind.

Office Wiz obviously represents a substantial programming effort. It attempts to replace your calendar, project- and contact-management, and accounting software with one integrated solution. It can run as a multiuser application, so data pertaining to all of its separate functions can be entered from any Macintosh on a network into a data file shared by all office employees.

Integration of all these functions has its price, and the principal price here is a lack of breadth in the individual modules (the second cost is a substantial investment of setup time). For example, the calendar is simply a list of dates, places, and the initials of relevant employees. And while Office Wiz contains certain general-ledger and accounting features, it does not have payroll capability.

Office Wiz also suffers from some interface problems that detract from its functionality. To be fair, most of these are problems inherent to 4th Dimension applications and can't be programmed around. Most notably, you can have only one window open at a time. Oryx Associates tries to circumvent this limitation by adding on-screen buttons and menus so you can jump from one module to another. Office Wiz does an admirable job of ensuring that you don't enter the initials for a nonexistent timekeeper or add a new task for a client that doesn't exist. Even so, it is clumsy to be constantly jumping around to different screens to add bits of information pertaining to a single case.

Office Wiz operates from the main screen, which acts as a control center for launching the user into different areas of the management system. The five main areas are calendar, billing, status, project, and office. Most of the data entry screens default to list view—another 4th Dimension interface convention. Double-clicking on any entry in the list shows the record in full. When you're in list view, buttons along the bottom of the screen provide a quick way to show all records or some (such as this week's appointments). The Next Section menu lists the various functional areas to which you can jump—from purchase orders to calendaring, for example.

Data entry verification in Office Wiz is fairly robust but not perfect. If you try to bill an invoice to a client who doesn't exist in the database you receive a prompt to add a new client. On the other hand, I was able to add myself as an employee twice with the same initials and Social Security number, a potentially hazardous flaw. Some entry screens that allow the user to pass the cost of goods to the client do not always calculate immediately.

On the whole, Office Wiz is busy. It has too many windows and too many settings to worry about. If your office absolutely requires an integrated, multiuser management solution, then be prepared to spend a lot of time setting up the software and learning to navigate it. For maximum return on your investment in the software, plan to hire Oryx Associates to further customize the software for your particular office needs. —BILL DAVIES

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Circle 1 on reader service card

Disk-Duplication Utility

SuperDuper 1.7

PROS: Simple; fast; progress indicator; optionally serializes copies. **CONS:** Proprietary disk image files; no overwrite safeguard; slower with IIfx and Quadras; expensive compared with competition. **COMPANY:** NeoConcepts (408/899-4821). **REQUIRES:** Mac Plus; System 6.0.2. **LIST PRICE:** $79.

MW ★★

ANYONE WHO HAS EVER TRIED duplicating even a few floppies with the Finder on a single-drive Mac will tell you that there's got to be a better way. There is. NeoConcepts' SuperDuper is a simple disk-duplication utility that deftly sidesteps the frustrating floppy shuffle. Unfortunately for NeoConcepts, the dance floor is crowded with similar programs available for considerably less money.

Upon launching the SuperDuper application, you insert the original disk at the prompt; it is read into memory in a single pass (provided your Mac has sufficient memory—about 1MB for a double-sided disk), then ejected. At this point you can either begin making copies or save an image of the original disk to a hard drive for easy loading in the future. Unfortunately, image files are not compressed, so the image of an empty double-sided disk takes up as much space as a full one: 820K. Even more disappointing is that SuperDuper images are not compatible with Disk Copy, the utility used by Apple to distribute software to its developers.

To make copies once an original disk or image has been read into memory, just feed floppies into the drive when prompted. This operation allows you to keep working in the background, but unfortunately there's no safeguard against overwriting existing data.

Animated disk icons inform you of the progress as SuperDuper automatically reformats and verifies while writing an exact, sector-by-sector duplicate of the original. SuperDuper is smart enough not to attempt copying high-density (1.44MB) disks to single-sided (400K) or double-sided (800K) disks, and vice versa. You can, however, copy the contents of a single-sided disk to a double-sided disk, as well as the other way around. SuperDuper simply reformats as it duplicates. When finished, the copy disk is ejected, and an on-screen counter increases by one. If SuperDuper encounters a problem, the disk isn't ejected until you acknowledge the alert box that appears—a safeguard that prevents you from accidentally putting the reject disk in the pile of good copies.

On my Mac IIci, copying a 1.44MB disk takes approximately 1 minute, 40 seconds; an 800K disk requires 54 seconds. Ironically, SuperDuper runs more slowly on the IIfx and Quadras because SuperDuper can't address the hardware directly.

Making Copies SuperDuper's animated disk icons inform you of the progress as copies are made.

While everyday users can benefit from SuperDuper's basic feature set, there is one option that appeals primarily to shareware or public-domain distributors. SuperDuper can automatically number disks by replacing a unique string of characters with a serial number. The characters to be replaced can reside in a Get Info window or an About box, or anywhere else on your original disk.

If you're sick of duplicating disks with the Finder, SuperDuper is an excellent alternative, but it's neither the best nor the least expensive. Apple's Disk Copy utility is widely available for free to the developer community, and DiskDup+ from Roger D. Bates (10899 N.W. Valley Vista Rd., Hillsboro, OR 97124) works similarly, has more features and better performance, and is available for $30 as shareware.

—OWEN W. LINZMAYER

Statistics-Analysis and Presentation Software

StatView 4.0

PROS: Powerful statistics capabilities; good tools for enhancing presentations; templates for repeat analyses. **CONS:** Weak data manipulation; Results window grows awkwardly; limited ANOVA support. **COMPANY:** Abacus Concepts (510/540-1949). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.4. **LIST PRICE:** $595.

MW ★★★

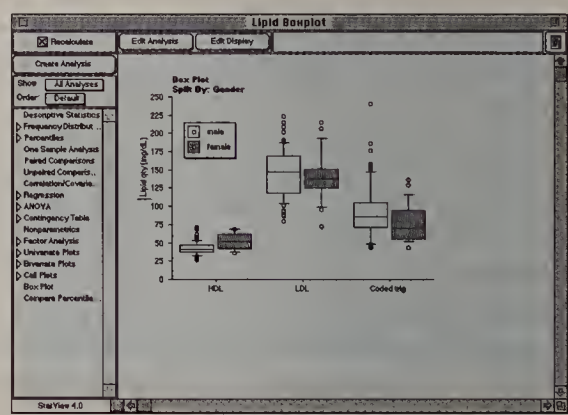
STATVIEW 4.0, THE NEW VERSION of the popular statistics package, has a strong selection of statistical tests and a passable Mac interface, and enables you to prepare output for publication or slides from within the program. You can adjust most aspects of a display except the data—font, size, shading, color, and so on. If this isn't enough, simple drawing tools let you add text, graphic elements such as circles and arrows, and accents such as drop shadows.

StatView's output is dynamic—change any number, and all related presentations recalculate using the new data. A slick Split By tool lets you show the underlying structure of data in any analysis or graph. For example, a graph of blood cholesterol levels can be divided to show the data separately by gender, by age group, or by both.

Templates let you record complete analyses so you can use them repeatedly or share them with colleagues. (A library of templates gets you started.) You can set up templates to record exactly how a journal wants your graphs to look. Then when it's time to submit results to that publication, you choose the data, and the graphs are done right every time. With canned analyses in templates, a professional statistician could have a lab technician repeat an analysis each time a new sample is measured. Unfortunately, the template can't judge whether the data is appropriate or well conditioned for that analysis. The results might then be misleading or just plain wrong.

When you enter or analyze data in StatView's speadsheetlike form, the top 12 rows contain format and data-type controls and descriptive statistics, such as mean and standard deviation. It's handy to have them visible, but you can hide them when they're not needed. Data can be easily imported or exported as text delimited by tabs, commas, or another symbol you designate.

Despite its many strengths, I found StatView annoying to use. The ANOVA capabilities are limited, presumably so as not to compete with Abacus's comprehensive Superanova product. StatView also lacks 3-D graphs and cross-referencing among outputs—for example, you can't brush or slice scatterplots, and you can't click on an outlier data point to display its identity or value as you can in Data Description's Data Desk or SAS's JMP. Unlike many other programs, StatView can't automatically restructure data into nested form—you have to cut and paste the pieces by hand. Also StatView puts all output, graphs and tables, into a giant, scrolling analysis view. It's so hard to find a particular Result in this haystack that there's a Results browser to help you.



Splitting a Boxplot I split three boxplots by gender and added the legend—with one mouse-click.

StatView offers a nice mix of statistical features and operating convenience, coupled with outstanding control over printed output. Its limited exploratory capabilities and many annoyances keep it from earning top marks.—PHILIP STEIN

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Virtual Disk Technology	✓	✓	
RISC Processor	✓	✓	
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Circle 2 on reader service card

Calendar Program

Easy Alarms 2.0.3

PROS: Lots of good features, including sound-recording and scripting. **CONS:** Complicated. **COMPANY:** Essential Software (914/889-8365). **REQUIRES:** Mac Plus; System 6.0.5. Recommended: Hard drive. **LIST PRICE:** $99; five users $299; ten users $499.

MW ★★★

EASY ALARMS IS A CALENDAR, REminder, and to-do list program with a plethora of features, some essential to any calendar program that aspires to be more than bare bones, others truly elaborate.

Easy Alarms has two main windows, the calendar window and the list window. When you open a calendar, the calendar window appears, sized and positioned as it was when last closed, and displaying the current month, with events appearing in the small day boxes. The formats of events, and the fonts and styles of most of the calendar, can be changed, as can all aspects of the colors.

The list window shows a list of dates and activities. The range of dates displayed can include a single day, a week, a month, or a more complex option from the Custom View dialog box. Unlike in the calendar window, within the list window you can easily cut, copy, and paste your reminders. Unfortunately, the text doesn't wrap in either the calendar window or the list window, so if you use long reminders, you have to increase the window size or reduce the text size. Fortunately, you can do both.

Easy Alarms has plenty of nice features. The windows can be resized, and their position is retained, centered on the same spot. You can use any of your system sounds as alarms, or record your own. There are lots of printing options, including text, daily and weekly planners, and monthly calendars. You can also block reminders from interrupting specific applications; a blinking Easy Alarms icon over the Apple menu icon shows you that the reminder exists.

The scripting function lets you create reminders for a wide range of feats, including shutting down the Mac, launching a program at a certain time, or making the screen flash when the text of the reminder appears.

Easy Alarms also runs on a network, so you can send reminders, including both sounds and scripts, to other users. (Yes, you can make someone else's computer flash a thousand times, and no, they won't necessarily be able to trace it to you.)

My only problem with Easy Alarms is that it's too complex. There are about four ways to do some things. Opening a list window is a matter of double-clicking on a day box, or clicking and holding the mouse button and choosing Stay Open from a pop-up menu, or option-clicking on a day, or selecting a day and hitting return. There are at least as many ways to get a reminder dialog box. Is it flexibility, or is it just complicated?

The time-contingent menus offer all kinds of possibilities, but they're frequently presented in a bit of a patchwork quilt. For example, the Snooze button offers a menu of 1 minute, 5 minutes, 10 minutes, and so on, until you reach Other. You can then weave your way through two more menus, and your choices are still limited. A single menu that allows you to enter a number for minutes, hours, days, weeks, and so on, would be simpler and more practical.

I don't like the manual, but that is mostly because I don't like being patronized. See page 16—". . . choose 'Open Visible Calendars on Launch' from the File menu. Remember what this will do?" It's not a confusing command—and is explained three pages earlier! Still, some commands seemed less than instinctive. I admit, I had to search for the meaning of "Late Limit—Forever."

Perhaps I'm too critical—flexibility, options, and choices are overall positive characteristics. And overall, Easy Alarms is a fine, useful program. If you want a calendar that can do more than sound an alarm, this may be the calendar for you. —WENDY SHARP

Educational Adventure Games

Eco-Adventures in the Oceans 1.0
Eco-Adventures in the Rainforest 1.0

PROS: Significant topics; lots of information; Rainforest package includes excellent book. **CONS:** Clunky navigation; sudden-death surprises typical of adventure games. **COMPANY:** Chariot Software Group (619/298-0202). **REQUIRES:** Mac Plus; second disk drive; System 6.0.2. For color: Mac II; 2MB of RAM; hard drive. **LIST PRICE:** $49.95; color version $59.95.

MW ★★★

THOUGH I DON'T USUALLY CARE much for so-called adventure games, I enjoyed these two. In each, Chariot takes on the difficult task of expressing the richness of a vast ecology in a simple educational game—with creditable results.

In both games, you are an explorer who's given a mission; typically, it's to find a certain animal. While searching you can score points by pursuing other goals as well, like stopping logging or cleaning up an oil spill. The main screen shows a scene of your whereabouts, with icons you click on to look, touch, examine, or photograph; a button to summon your guide, who provides vital information; a text box; a map button; and directional navigation buttons. It's best to move methodically: click on a direction to move one square, then click on the guide button for hints and warnings, then click on Map to see where you are, then click to return to the main screen. If the guide says, for example, "the tree kangaroo is close by, to the southeast," you try moving a square south, a square east, and so on—checking the map and consulting the guide frequently.

Sometimes you meet disaster. In Oceans, the nasty Portuguese man-of-war jellyfish may appear; the ensuing sequence, where your hand swells up horribly and you die, is gross enough to delight a sixth-grader. In Rainforest, a boa constrictor is apt to drop suddenly from a tree—that's all—next game. Save often. Both games have lots of pitfalls and predators.

You're told from the start that this is an imaginary landscape: a rainforest that combines features not found together in nature, or an ocean that's a composite of all the world's oceans. At first it's disconcerting to meet Pygmies in South America; you get used to this scheme, but I think it could confuse some players about the facts.

Unlike typical adventure games, these two give you only a short time for your mission. Then you return to headquarters (whether you've attained your goal or not) to face a press conference—a multiple-choice quiz. I like this approach; it's nice to get out of the forest (or ocean), and the questions are interesting.

A Bird in the Bush A colorful rainforest inhabitant you may encounter. Click on the bird to highlight it, then on the camera icon to snap a photo for extra points or extra time.

Rainforest comes with a first-rate book, *The Rainforest Book*, by Scott Lewis with the National Resources Defense Council. This smallish, well-written paperback is packed with information (but no maps and charts to help make sense of it all).

Both games are good. I prefer Rainforest (I survived longer there, and the animal sounds are lovely); it's probably the one to choose if you're getting just one, because of the book.—FELICITY O'MEARA

Arcade Game

Red Baron

PROS: Entertaining format; superior graphics. **CONS:** Too many dialog boxes between games. **COMPANY:** Dynamix (503/343-0772). **REQUIRES:** Mac LC; 2MB of RAM (4MB for System 7); hard drive; System 6.0.5. Recommended: Joystick. **LIST PRICE:** $69.95.

MW ★★★

RED BARON, THE FIRST INSTALLment in Dynamix's Great War Planes series, has something for every aspiring ace. The game combines the realism of a flight simulator with the romance of history. In addition, it has outstanding graphics and enough realistic dogfighting to keep you playing for hours.

The 220-page manual is a history lover's dream—it's composed mostly of factual anecdotes and technical information about the World War I fighters, including a chapter on aerial tactics. Only the last 50 pages cover how to play the game.

Red Baron is a one-player game that has two modes of play. You can either enlist for the duration of WWI in career mode or fly a single mission. In the single-mission mode, you choose one of 10 missions, from tracking a zeppelin to engaging in one-on-one battles with famous WWI aces such as Manfred von Richthofen (the Red Baron). In single-mission mode, you adjust game difficulty on the Realism Panel, whose 11 settings affect factors like weather conditions, pilot blackouts, and navigation. The more realism you choose, the more difficult you make the mission. (Practice single missions to hone your skills before signing up for a career.)

Career mode challenges your skill because it has all realism factors turned on. You enlist in either the German or the English air force in December 1915 and continue until you're killed or the war ends. The 40 missions vary from routine reconnaissance to battles against the greatest aces of the war. As your victories mount, you receive promotions, command your own squadrons, and win medals.

A View from the Cockpit Detailed graphics lend realism to the WWI flight-simulation game Red Baron. Players can choose to portray English or German aerial aces and fly one mission, or play a game that lasts until the war's end or the pilot's demise.

To control your WWI fighter, you use a joystick, mouse, or the keyboard. I prefer a joystick, but if you don't have one, try the keyboard. The mouse's controls are the least precise, especially in a dogfight. You have to think three-dimensionally. An enemy plane can attack from any direction, and usually does—especially at higher levels of play—so you must keep a constant vigil on the skies all around your aircraft. To help you out, Red Baron offers six viewing angles from within the cockpit.

The one, minor complaint I have with Red Baron is the game's speed. If you play with MultiFinder turned on, the game usually crashes; if you're running System 7, it runs a little slowly. You can speed up the game by lowering the level of detail in the graphics. If the game still runs slowly, try moving the time scale to the maximum setting. If you change those settings, even on an LC the game moves along at a brisk pace. One other small annoyance is that you have to negotiate five dialog boxes before getting to the simulation.

But these minor flaws shouldn't stop you from going out and buying Red Baron, one of the top military-flight-simulation games for the Macintosh.—ANDREW MILLER

Mapping and Geographical Data Software

GeoQuery 3.02

PROS: Quick geographical analysis of data. **CONS:** Uninspired mapping capabilities. **COMPANY:** GeoQuery Corporation (708/357-0535). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0. **LIST PRICE:** $395.

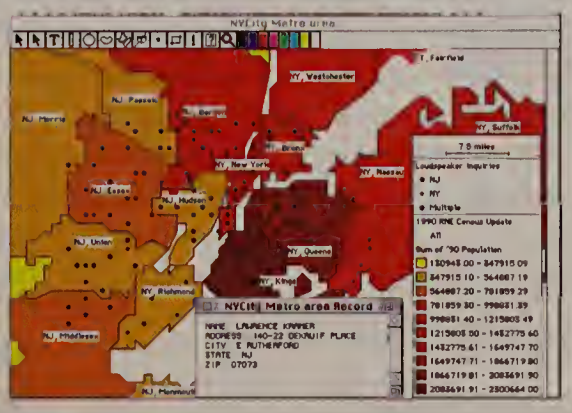
MW ★★★★

ORGANIZING INFORMATION GEOgraphically is often the best way to understand it. GeoQuery, a custom-map generator and data-analysis program, lets you view database files and explore their relationships in geographical context. GeoQuery produces "pushpin" maps, with symbols representing database records plotted on the map; and shaded maps, with patterns and colors representing data values. In addition, GeoQuery serves as a front end to your database. Clicking on a map's data points displays individual records. Clicking on map regions gives access to data summaries and reports on selected records.

GeoQuery comes with atlas files for the United States and 11 major metropolitan areas. The program also includes files for plotting interstate highways, and a selection of data files from the *1988 State & County Handbook* and the 1990 Census.

Although GeoQuery produces good-looking custom maps, the program lacks the cartographic versatility of other products, such as Atlas Pro. GeoQuery's U.S. atlas is adequate at the state level but lacks detail when cropped and scaled for localities. The metropolitan-area atlases offer better resolution, but if you need to map rural areas, you must look to the county atlases that are sold separately. (Files from different county atlases can't always be combined, so study your requirements carefully.) Atlases for Areas of Dominant Influence, Designated Market Areas, and Metropolitan Statistical Areas, used to determine TV ratings and to rank urban areas, are also available.

GeoQuery's real strength is data analysis.



Geographic Inquiry This map plots population and customer records of counties in the New York City area. Click on a data point, and the record pops up.

It makes no provision for keyboard data entry, but it accepts records from any spreadsheet or database, so long as they're in tab-delimited format and include zip codes. GeoQuery uses zip codes to plot pushpin data points and to count records for shaded maps; however, data lacking zip code information can be ascribed to regions by name.

Once records are plotted, GeoQuery can sort data according to geographical criteria (say, records in a state) and apply those criteria to any database field. How many customers within 50 miles of Atlanta need a service call? To find out, drag a circular region and sort the collected records.

When you click on pushpins, the displayed record is a local copy, not the entry in the actual database file. However, the results from geographic sorts can be exported to spreadsheets or statistics programs for further analysis. System 7 enables GeoQuery to subscribe to database programs and receive automatic record updates. The program can also publish updated maps to page-layout or presentation packages.

At times, GeoQuery is a little unforgiving—for instance, you can't undo if you crop a map incorrectly—but overall, the program operates competently and efficiently. GeoQuery's value lies in the correlation of data and geography, and often a little geographical perspective is just the insight you need. —CARLOS DOMINGO MARTINEZ

PC To Mac File Exchange Without Translators Is Like A Foreign Film Without Subtitles.

Sharing files between PCs and Macs is no longer a luxury, it is a necessity. But it doesn't have to be a foreign concept.

Lots of products on the market claim to solve your problems of sharing files across platforms, but take a careful look before you buy.

Some, such as disk mounting utilities only give you a partial solution; and when your file appears on screen, you get a big surprise. You can't read a word of it - not your text, not your formatting - it looks like garbage.

You see, transferring your files only gets half the job done. What you need to finish the job is translation. What good is it to simply transfer a file from a PC if you can't decipher it once it hits your Mac?

MacLinkPlus from DataViz is the *total solution* for both file transfer and translation.

It's been on the market since 1984 and has led the way in bridging the gap between PCs and Macs. With over 600 translation combinations for the most popular word processing, spreadsheet, database and graphics applications, you'll find it the strongest translation product with the widest breadth of translation possibilities anywhere!

MacLinkPlus is the solution to virtually any problem you may encounter in moving files between PCs and Macs. And being able to read them - with their formatting intact - once they get there.

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Circle 36 on reader service card

Burps on Disk

BY DAVID POGUE

EVERYONE KNOWS WHAT CLIP art is: ready-to-spread drawings on a disk that even the most unartistic Cub Scout–newsletter editor can slap into PageMaker for a little visual spice.

But times have changed. We're becoming a generation of forward-thinking multimediacs who can't sit through a business presentation unless it looks like MTV—sound track thudding, animated growth curves twitching, sound effects crackling. So to help make your Mac just as noisy as the pros', a new product category has been created: *audio* clip art, for want of a better term. Some of these collections require a CD ROM player connected to your Mac. Others are clearly designed more for fun than for serious sound-track making. But here they all are: the clangorous, the harmonious, and the totally bizarre.

Online Services

"WHOA!," YOU'RE THINKING. "WHAT ARE dial-up information services doing in a sounds review?"

Turns out, America Online (AOL), CompuServe, and other modem-accessible services are outstanding and economical sources of digitized sounds. I discovered them the night I was trying to make a demo tape of a song from a musical, in which a subway car is supposed to crash. How on earth would I get such a recording (other than waiting around the New York City subway system with a microphone)? I went onto AOL and searched for "brakes or bomb or crash or explosion," found a dozen possibilities, read their descriptions, and wound up combining a pair of them to produce the world's most realistic subway-car accident. On AOL ($4 per evening hour), there are 3000 Mac-ready audio clips; CompuServe ($12.80 per hour) has 1200 awaiting you. No disk-based source gives you that many sounds to choose from. An hour of downloading is about an 800K disk's worth of sounds.

To search for sounds on AOL, press ⌘-K, type **QuickFinder** (press return), and type a keyword for the sound you're looking for (like **squeak** or **explosion**). Using CompuServe Information Manager, double-click as follows: Mac Forums, Entertainment Forum, Browse Libraries, then the sound category you want (TV, Sci-Fi, Movie, Other). Use the Libraries menu to search.

SoundClips

THESE NINE FLOPPY DISKS (OLDUVAI, $149) bring you 300 digitized sounds: office (typewriter, fax machine), human (laugh, cough, hiccup), environmental (traffic, machinery), and so on.

There was no standard Mac sound format (the sonic equivalent of a text file) until very recently. Instead, sounds come in a variety of competing formats (HyperCard, AIFF, SoundEdit, and so on); fortunately, SoundClips are normal System 7 sounds (double-click on the sound file icon to play). That makes finding, organizing, and listening to them easy. Furthermore, SoundClips have been recorded at the highest quality setting on the Mac, what wireheads call "22kHz." (Recordings in the other popular setting, 11kHz, take up less disk space but sound tinnier.)

Unfortunately, the recordings themselves are not exactly top-drawer; a friend of mine with her eyes closed couldn't identify many of them. Another batch is obviously homemade: spacey synthesizer blurts, people uttering words, doors opening, and so on. But if your Mac has a microphone (or if you have a Macromedia Mac Recorder), you can do those sounds yourself.

Kaboom for Macintosh

CORPORATE PRESENTERS AND MULTIMEDIA-HEADS: skip this one. Kaboom is 150 sounds designed exclusively for use in the Mac environment: error beeps, start-up sounds, and so on (Nova Development Corporation, $49.95). As such, Kaboom comes complete with a thinly disguised version of SoundMaster, the shareware control panel that lets you assign any sound to any Macintosh event: inserting or ejecting a disk, opening a window, emptying the Trash, and so on.

Kaboom's sounds are polished and consistently realistic, despite the fact that most were recorded at the lower-quality 11kHz. The only one that I couldn't identify by listening was "body falling on car hood" (which may say less about the recording than about my sheltered Ohio upbringing). With SoundMaster's help, you can have applause when you turn on the Mac, glass breaking when you insert a disk, and any of various "I Love Lucy" snippets when you shut down for the day. I also found that the phone rings, PA announcements, and crying babies are useful for tactfully getting off the phone.

Where to get clip art for the ears—and why

Mr. Sound FX

YOU KNOW THAT GUY IN THE *POLICE Academy* movies who's always making funny sound effects with his mouth? Now you can have 75 of his warbles, whoops, and impersonations coming out of your Mac speaker (Prosonus, $29.95).

Michael Winslow certainly does a better adding machine and bottle rocket than I do. But since very few of his sounds sound more like the real thing than the real thing, it's hard to dismiss the teeny-weeny question that hounds your consciousness: Er . . . what's the point? On the other hand, there are also 75 non–Michael Winslow sounds, most recorded at 22kHz and perfectly useful (even if they don't have the gale-force whimsy of Kaboom). And when Winslow stops trying to out-moo real cows, he comes up with some goofball treasures, like the utterly inexplicable dialog snippet: "Mr. McEnroe—" "*WHAT!?!*" If you can figure out what to do with this stuff, it's certainly priced low enough. Maybe the inclusion of the redoubtable SoundMaster will give you some ideas.

Star Trek AudioClips

THE "STAR TREK" ZEALOTS at Sound Source Unlimited have gone to an unbelievable amount of trouble to assemble, edit, and secure the rights for these sounds, which are lovingly digitized from the original Paramount master reels and recorded with 22kHz clarity. There are two volumes of "Star Trek" (66 sounds each; $59.95); two of "Star Trek: The Next Generation"

continues

(about 80 sounds per set; $69.95); and even a disk of *2001: A Space Odyssey* clips (85 sounds; $69.95).

In addition to classic lines like "I'm a doctor, not a mechanic!" you get a hearty sampling of classic sound effects (tricorder, bulkhead door hissing, transporter) and hilariously hokey music cues. Choicest of all are the dialog excerpts, which have been selected according to their applicability to working on the Mac. Using the included SoundMaster (surprise!), you can make Bones say "He's dead, Jim!" when you insert a bad disk, or "His brain is gone!" when you empty the Trash. Or, for a spine tingle when you shut down the Mac, program the disturbingly mellow voice of HAL (from *2001*) to say: "I know that you were planning to disconnect me."

Cool Mac Sounds

IT'S A BOOK! IT'S A DISK! IT'S A BOOK-DISK combo! Author Craig O'Donnell is as knowledgeable as they come about desktop Mac sounds (Hayden, 150 pages). Maybe *too* knowledgeable: "The output is 8V peak-to-peak, source impedance 32 ohms" says the introduction (without ever defining *V*, *peak-to-peak*, *source impedance*, or *ohms*). For a topic as jargon-heavy as audio, a glossary would be welcome.

There are 50 sounds on the disk—some good, some homemade-sounding. Then there's a collection of sound-related shareware (including, inevitably, SoundMaster) that lets you stick sounds anywhere they can be stuck. If you're an advanced Mac audiophile and you like your shareware in one tidy package, $19.95 is entirely reasonable.

Sound Machine

SINCE SOUNDS TAKE UP A LOT OF DISK space, it's no surprise that the serious sound collections come on CD ROMs. To play them, you need a CD ROM player (about $400).

Sound Machine (Educorp Computer Services, $49.95) is another assemblage of sounds and utilities from the nebulous world of shareware. Because it's a collection of Educorp's individual floppy-disk titles, you get a bunch of folders, each containing a few sounds, plus—all together now!—SoundMaster. The result: 30 copies of SoundMaster and disorganization. The curator's taste leans heavily toward the *Star Wars*/Monty Python school. Many of the TV-show sounds seem to have been recorded from an awful-sounding TV speaker (without permission, I'm told). Some of them, like the "Simpsons" recordings, were recorded at a barely intelligible 7.5kHz quality. (There's about 70MB of stuff on the 600MB CD ROM, so don't try to convince me that the sounds were recorded at the poorer quality to save space.) I don't mean to imply that there aren't gems, but there's a lot of chaff to dig through first (including multimegabytes of obsolete VideoWorks, StudioSession, and even MusicWorks files). Too bad the Search command of the HyperCard index stack doesn't work.

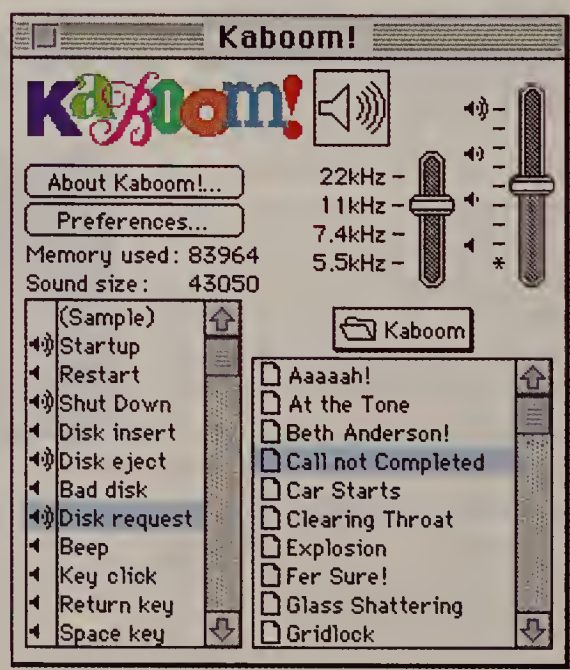
Desktop Sounds

THIS CD ROM (Q UP ARTS, $99.95) IS MORE like it: 400 professionally recorded 22kHz sound effects in neatly labeled folders: Aircraft, Automotive, Combat, Destruction, Industrial, Sports, Small Machinery, and so on. (Did your eyebrows react to the Rambo-nic maleness of the topics as much as mine did?) A HyperCard stack lets you browse and hear the sounds, which are described in sometimes weird detail ("Gurgling, snorting hippos happily frolicking"). You're often given several *different* recordings of the same thing—applause comes in several flavors with different-size groups of varying enthusiasms, for example.

Instead of general desktop silliness (like Kaboom), this CD ROM is designed for presentation or animation work. Once again, though, you have to wonder why the 600MB CD contains only 27MB of stuff. C'mon, Q up . . . fill 'er up!

SoundFX

AUDIO PROFESSIONALS ARE PROBABLY half finished with their angry letters to the editor, asking, "What about 16-bit stereo sounds?" I readily admit that I have left those CD ROMs out of this review—the ones that require a $1000 stereo sound board installed in the Mac.



By Any Other Name SoundMaster, the clever control panel that lets you attach sounds to various Mac events, crops up under various pseudonyms in sound-effects collections.

This pricey CD ROM (Educorp Computer Services, $179), however, strikes a clever balance: it includes each of its 250 sounds in *both* Mac-playable and stereo-playback-board formats. The sounds, and the variety, are outstanding. I especially liked the folder full of "environments": ambient background noise from a baseball game, a shareholders' meeting, an accident scene, and so on. They're *long*, too, some lasting more than a minute. Actually, I haven't a quibble in the world, except that I wish there were more; in today's dog-eat-dog multimedia world, 250 sounds, no matter how sterling, won't get you very far.

The CD ROMs reviewed here don't exhaust Educorp's list of sound collections, by the way; call for a catalog. Their upcoming A Zillion Sounds disc should be the sound-monger's fantasy.

ClipMedia

IT'S A CD FROM MACROMEDIA THAT'S crammed full of clip art, clip sounds, clip music, and (soundless) clip movies: 624MB in all. Each of the 250 sounds is included in four different formats: two 11kHz formats (which is a little silly, because you could easily convert one format to another) and two 22kHz stereo formats (one of which requires a playback board). The selection is great—four kinds of crowd noise, two different camera clicks, the entire set of telephone touch-tones—but many individual clips were recorded too softly. Don't get this CD ROM for the sounds; but if you can afford to spend $395 for its other offerings, consider the sounds a bonus.

The Upshot

CLIP SOUNDS COME IN TWO VARIETIES: one for people who like to play with sounds while working at the Mac, and another for people who need hard-core FX for multimedia work. The playful group, I think, will be happiest with Kaboom. (Unless they're Trekkies. You know who you are.)

In the more serious category, the most useful collection (that doesn't require a stereo NuBus board) is Desktop Sounds. It's a shame that its files aren't in standard System 7 sound format (as SoundClips and Star Trek are), where you just double-click on an icon to play the sound. But I suppose any format would do for the presentation maker who's desperate for a good hiccup. **m**

See *Where to Buy* for contact information.

Contributing editor DAVID POGUE wrote *Macs for Dummies* (IDG Books Worldwide, 1992). He's grateful that clip odors have not yet become fashionable.

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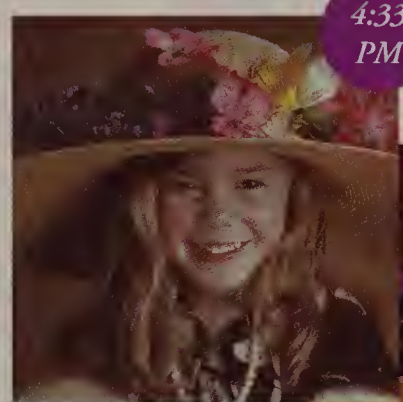
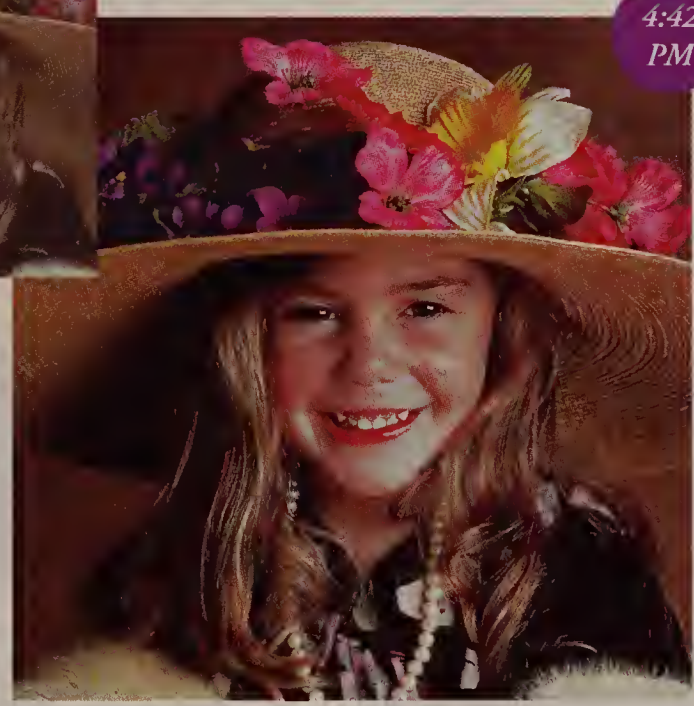


"No color, pump up the saturation"



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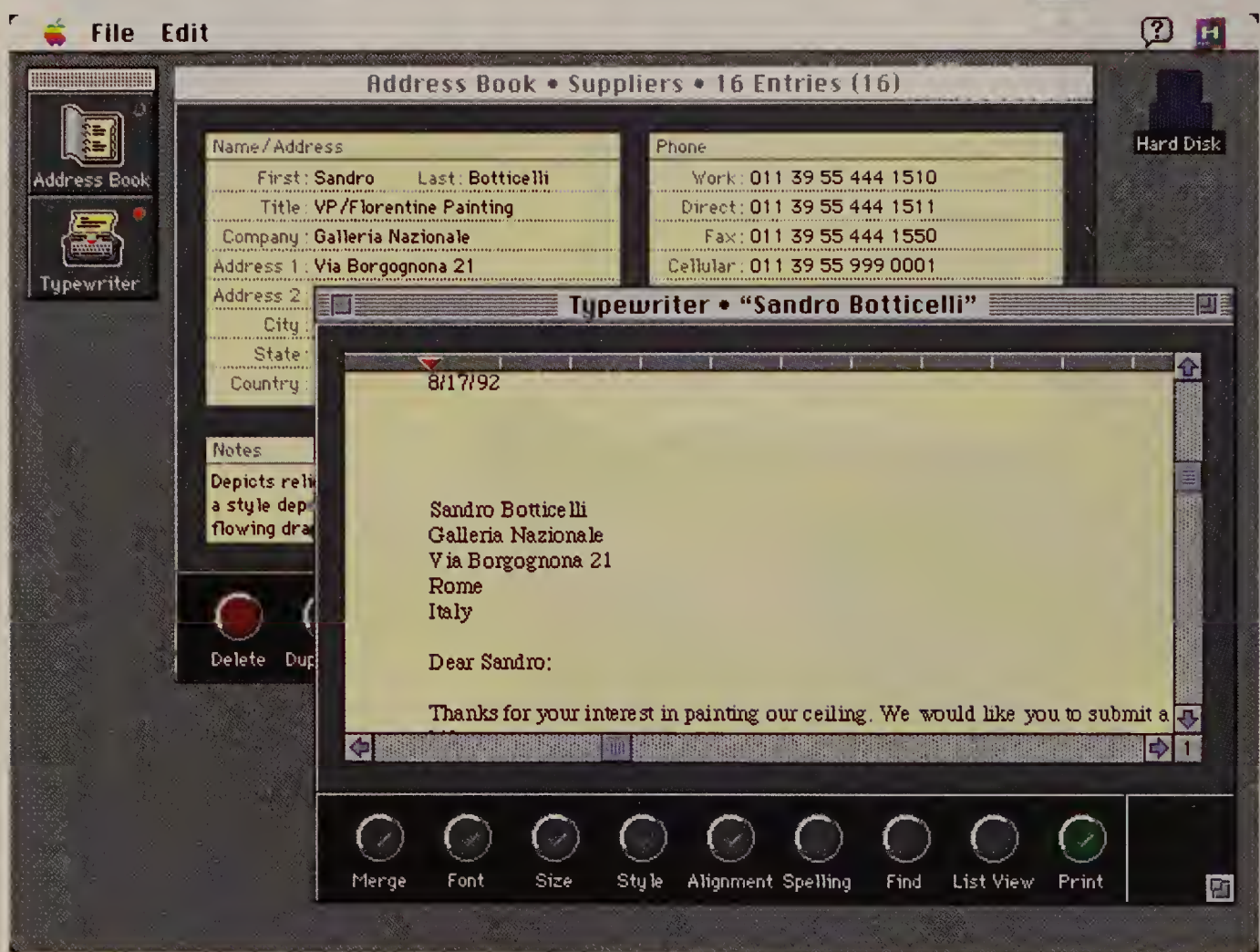

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New Products

The Latest Macintosh Releases

EDITED BY EVAN COOPER

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY MACWORLD. ALL PRICES ARE SUGGESTED RETAIL. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

Colorstream/DS
A color dye-sublimation printer that uses ROM boards and comes with a 24-bit PostScript Level 1 interpreter called PowerPage. The printer has two ROM board slots that can be filled with printer emulation boards, font boards,

Colorstream/DS

and other functional boards as they are developed in the future. Includes GrASP technology, which allows a variety of computers running different platforms to be connected to the printer at the same time. GrASP also scans the ports for print data and automatically switches to the proper emulation. The product uses AMD's 29050 RISC microprocessor, which has an FPU on-board, and it comes with AppleTalk, parallel, RS-232C, and SCSI ports. $11,900. Mitsubishi International Corp., 408/980-1100; fax 408/980-8891.

ColorTone
A continuous-tone 300-dpi dye-sublimation color printer that has built-in AppleTalk and EtherTalk support, comes with 10MB of RAM, and has a 100MB internal hard drive that supports font storage and virtual memory. The device uses GCC's proprietary controller built around an AMD 29000-series RISC-based processor and a PhoenixPage PostScript-compatible interpreter. The printer can take three-color and four-color printer cartridges. $10,999. GCC Technologies, 617/890-0880, 800/422-7777; fax 617/890-0822.

DaynaPort E/II-3
A NuBus Ethernet board that comes equipped with RJ-45, BNC, and AUI ports and autosensing technology that automatically configures the board for whatever type of media it is connected to —thin, thick, or 10BaseT cable systems. The product comes with 64K of RAM and supports a variety of protocols, including AppleTalk Phase 1 and Phase 2, TCP/IP, DECnet, and OSI. $319. Dayna Communications, 801/531-0600; fax 801/359-9135.

DaynaPort E/II-3

DesignMate
A pen plotter that makes prints in up to eight colors in sizes A through D at a resolution of 0.0005 inches, or 2032 steps per inch. The device uses a brushless motor, has an eight-pen turret, and comes with 30K of RAM. CalComp says it can plot at speeds up to 20 inches per second and has a MTBF rate of over 6000 hours. Other features in-

DesignMate

clude automatic cut-sheet sizing, a desktop media guide, and software that lets users set the plotter's parameters and calibrations. The plotter supports CalComp PCI and 960 protocols as well as HPGL and HPGL/2. $1992. CalComp, 714/821-2000, 800/932-1212; fax 714/821-2714.

DiamondDrive 1500
A 1.5-gigabyte SCSI hard drive based on a Maxtor mechanism that the company claims has a seek time of 13ms and a MTBF of 100,000 hours. The drive ships formatted with System 7 and includes Mass Microsystems' PadLok HD Utility for formatting, partitioning, testing, and password-protecting the media. In addition, it includes two-year warranty and comes with Siesta, software that parks the inactive drive's heads. $4999. Mass Microsystems, 408/522-1200, 800/522-7979; fax 408/733-5499.

The Extender
An accelerator that plugs into the LC's expansion slot and is equipped with a 16MHz 68030 processor. The 68030's built-in memory-management unit, combined with the included driver software, enables the LC to utilize System 7's virtual memory capabilities. The board is also available with an optional 16MHz 68882 math coprocessor. $229; with FPU $294. Extreme Systems, 206/575-2524, 800/995-2334; fax 206/575-3928.

Faxcess
A device that stores hundreds of documents and allows callers to request—via a touch-tone phone—to have any of the documents faxed to them. A user downloads documents to the device using a Macintosh and a fax

Faxcess

modem and then assigns a number to each document and posts an index of the documents that callers may request. The unit includes a feature called SupportPort that enables ComArt's technicians to upgrade, diagnose, and repair the device remotely. Device can also track how many times each document is requested. $2495. ComArt International, 714/859-2000, 800/266-2787; fax 800/329-3366.

Hubster
An IEEE-compliant 10BaseT Ethernet hub with eight twisted-pair ports and one AUI port. The device has LED indicators for power and for individual port-link status. It can also connect to IEEE 10Base5 network segments through the AUI port. $399. Transition Engineering, 612/941-7600, 800/325-2725; fax 612/941-2322.

Image Magic DSP
An accelerator designed to speed up specific operations in Adobe Photoshop, such as JPEG compression and decompression, image resizing, and special effects filters like Unsharp Mask and Gaussian Blur. The board is based on an AT&T WE DSP32C digital signal processor with a floating-point unit; NuBus and PDS versions are available. It also speeds operations in other programs that use Photoshop's plug-in standard, such as Adobe Premiere, and Fractal Design's ColorStudio and Painter. Additional filter support can be added in the future through software upgrades. NuBus $995; PDS $895. Newer Technology, 316/685-4904, 800/678-3726; fax 316/685-9368.

Image Magic DSP

Jolt PS
A 300-dpi color printer that uses the company's proprietary Solid Ink technology, is equipped with

Jolt PS

Adobe's PostScript Level 2, and prints on paper sizes up to A4. The printer supports AppleTalk, as well as parallel and serial interfaces, and has a SCSI port for adding a hard drive. It comes with 1MB of memory, upgradable to 6MB, and the company claims it has print speeds of 2 pages per minute for text, 1 ppm for text and graphics, and 0.7 ppm for graphics alone. $6995. Dataproducts Corp., 818/887-8000, 800/289-5658; fax 818/887-4789.

LANCruiser
A compact print server that plugs into the parallel port of NEC Silentwriter, Colormate, and Pinwriter printers, allowing users to share the printers across a multiplatform network. The device is compatible with Novell NetWare 2.2 and 3.11 and is available in thin or twisted-pair cable format. Users can print status and configuration information by pushing a switch, helping them identify hardware errors. $649. NEC Technologies, 508/264-8000, 800/632-4636; fax 800/366-0476.

Micro/CD-ROM
A series of CD ROM players that provide access to Kodak's Photo CD photographic image discs, standard audio CD discs, and all ISO 9660 and High-Sierra format CD ROMs. The drives have an average access time of 350ms and a sustained data-transfer rate of 150K per second, according to the company's literature. The included utility software automatically mounts data and photo CDs and provides a control panel for playing audio CDs; the drives also have stereo audio outputs and an automatic head-parking system. $995. MicroNet Technology, 714/837-6033; fax 714/837-1164.

PMT600
A 600MB tape backup subsystem based on a Teac tape mechanism that the company says has a data-transfer rate of 196K per second and a tape speed of 60 inches per second. The drive writes to CT600F tapes from Teac, and to other Teac tapes with lower capacities; it is bundled with Retrospect Remote backup software and has an external SCSI ID dial and termination. External model $1595; internal

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Pocket Port Fax Modem
A send-and-receive fax modem designed for use with Outbound Notebook Systems and Macintosh PowerBooks but that works with any Macintosh that supports V.22bis, V.21, V.42, V.42bis, and MNP Class 5 data compression and error correction. The device measures 3.3 inches by 2.3 inches by 1 inch and is ADB powered. The Pocket Port features automatic and manual dialing and answering and a speaker so users can hear when a connection is made. $379. Outbound Systems, 303/786-9200, 800/444-4607; fax 303/786-8611.

Power Package
An upgrade package for PowerBooks that includes a Go-80 internal 85.8MB hard drive from Quantum Corporation, a 4MB or 6MB memory board from Advantage Memory Corporation, and a 9600-bps send and 4800-bps receive pocket fax modem with V.22bis compression. The package also includes a nylon portfolio bag from Targus. $1199. Relax Technology, 510/471-6112; fax 510/471-6267.

PrecisionColor 8Xj
An accelerated, 8-bit color, two-page NuBus board for the Mac II and above; supports monitors with resolutions of up to 1152 by 882 dpi. The board is compatible with all monitors from Radius and Apple and a variety of monitors from third-party vendors. $599. Radius, 408/434-1010, 800/227-2795; fax 408/434-0770.

RasterOps/20 Multimode
A multiple-frequency color display that uses Hitachi technology to provide support for resolutions from 640 by 480 pixels to 1024 by 768 pixels. The monitor can be used with a Macintosh or with an IBM PC with a VGA graphics adapter. It supports vertical refresh rates of 50Hz to 120Hz and can be used with any RasterOps display board as well as a variety of boards from other vendors. Berkeley Systems' After Dark 2.0v screen-saver software is included. $2499. RasterOps, 408/562-4200, 800/468-7600; fax 408/562-4065.

RenderServer 1
A self-contained network peripheral designed to speed 3-D rendering with an i860 processor running at 40MHz, 8MB of RAM, on-board Ethernet, a 200MB SCSI hard drive, and a 1.44MB floppy drive. It comes bundled with Pixar MacRenderMan 3.2, VideoBits' RayCar ray tracer, and Lawrence Berkeley Laboratories' Radiance radiosity renderer. Torque's RenderManager software and Tuplex multiprocessor system let users send native Mac files to any of the included renderers automatically over Ethernet. $11,900. Torque Systems, 415/321-1200; fax 415/321-1298.

RenderServer 1

RFS 2035
A 35mm color negative and slide scanner that uses 10-bits-per-channel, RGB, analog-to-digital conversion to provide resolutions up to 2000 dpi. The desktop unit also features auto exposure, color balance, focus, and fixed and adjustable film channels. It has a fixed film gate that takes a strip

RFS 2035

of six negatives or four slides. Included extensions for Adobe Photoshop and other image processing packages let users scan images directly into those applications. $7995. Eastman Kodak, 716/724-4000; fax 716/724-0663.

SilverView Pro
A 21-inch landscape gray-scale or monochrome high-resolution monitor that allows a user to see two full-size 8½-by-11-inch pages on screen. The monitor displays 1152 by 870 pixels with a resolution of 72 dpi, has a refresh rate of 75Hz, and supports the SE/30, Mac II family, and Quadra series. The monitor's emissions meet the Swedish guidelines for ELF and VLF magnetic-field emissions. $1295; with OCLI antiglare, antistatic panel $1495. NuBus gray-scale board $545; NuBus or PDS monochrome board $365. Sigma Designs, 510/770-0100, 800/845-8086; fax 510/770-2640.

ThunderStorm Accelerator for Adobe Photoshop
A NuBus board based on two programmable Digital Signal Processors that are optimized to handle the mathematical functions at the computational heart of Adobe Photoshop's filters and functions. Photoshop's Gaussian Blur, Unsharp Mask, Sharpen Edges, and Sharpen More filters and the Resize function are especially enhanced. The board also features hardware-accelerated JPEG compression. $999. SuperMac Technology, 408/245-2202, 800/334-3005; fax 408/524-4797.

Video F/X Plus
A Mac-based video post-production system designed to create professional-quality video productions; the product offers a dedicated module for controlling video decks; MIDI and QuickTime support; exportation of CMX, GVG, and Sony edit lists; type style effects; and Sony Laser Disc support. Also includes A/B roll, PICS animations, and Soft F/X software that creates offline graphics and provides nonlinear digital-editing features. $15,995. Digital F/X, 415/961-2800; fax 415/961-6990.

Vista V256
A removable, rewritable magneto-optical disk drive that uses 3½-inch 256MB cartridges and also reads and writes 128MB cartridges. The

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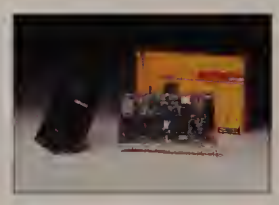
Circle 207 on reader service card

Vista V256

drive is based on MOST's RMD-5200-S mechanism, and Ocean claims it has an average seek time of 35ms. The device uses Automatic Media Sensing to identify the type of cartridge being used (128MB or 256MB) and comes with Compass software. $2295. Ocean Microsystems, 408/374-8300, 800/262-3261; fax 408/374-8309.

Xeba M1414XV
A 14,440-bps V.32bis fax/data modem that supports V.42bis, V.32, V.42, MNP Levels 2 through 5, and Group 3 send-and-receive fax protocols. The device has eight lighted icons that display the modem's status, as well as a front-mounted power switch. $769. Logicode Technology, 818/990-1235; fax 818/990-1264.



Xeba M1414XV

SOFTWARE

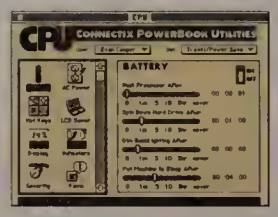
AniMedia
A clip-animation library that contains over 100 animation files in 8-bit color that can be imported into a variety of multimedia authoring and desktop-presentation packages such as MacroMind Director, Promotion, Authorware Professional, and HyperCard. The files are saved in Scrapbook and PICT formats and later can be converted to QuickTime movies. 2MB min. memory. $99. Animatics, 613/235-9000, 800/665-3898; fax 613/233-7157.

AutoLog 2.0
A videotape logging system that captures SMPTE time code, reel numbers, scene numbers, and automatically incremented take numbers; with a Mac II or above and a video digitizer, the application can also capture a color image of each scene. Users can then print the log or export it to another program for creating storyboards. The program includes Avid Digital F/X and EMC2 log translators and conforms to the Sony 9-pin protocol, so it can control professional VTRs, ATRs, and laser and optical disk players that have a 9-pin, RS-422 port. 1MB min. memory. Single user $495; $695 per site and $95 for each user. Pipeline Digital, 808/235-0335.

The Boston Harbor Sewage Stack
A HyperCard stack that teaches users about how municipalities deal with sewage, how sewage systems work, and what citizens can do to help; the information is focused on the Boston Harbor Cleanup program. Topics of exploration include storm sewers and combined sewer overflows, and problems of pollution from pets, spilled waste oil, and lawn and garden chemicals. 2MB min. memory. $20. MIT Sea Grant College Program, 617/253-7041.

Common-Practice
An instructional music package for high school and college students that covers elements of composition and harmony studies, including interval and chord recognition and spelling, figured-bass realization in four-part harmony, chord progression, voice leading, and harmonic analysis. Drill Maker, software that creates customized multiple-choice theory questions for use in Common-Practice, is included. Additional features include three practice levels, printed or on-screen progress reports, and online theory text. MIDI is also supported. 1MB min. memory. $199. Leading-Tone Software, 617/731-6678; fax 617/731-6678.

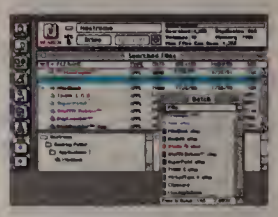
CPU Connectix PowerBook Utilities
A control panel for the PowerBooks that focuses on extending battery life, but that also has security and keyboard-customization features. Users select icons from the control panel to access the program's functions, and can create different power configurations for various situations. The program enables users to control the power consumption of the PowerBooks' hard drive, processor, and display; require a password to access data; and navigate dialogs and menus using only the keyboard. 2MB min. memory. $99. Connectix, 415/571-5100, 800/950-5880; fax 415/571-5195.



CPU Connectix PowerBook Utilities

DataMan
A scripting environment that lets users save scripted text operations, by using dialog boxes, when many frequent, similar changes must be made to documents, to folders, or to the Clipboard. 1MB min. memory. $35. FeatherSoft, 608/251-1735.

DupLocator
A disk- and file-management system that enables users to locate duplicate files, serialize searched disks, keep records of off-line files and disks, and archive files. The program generates reports on disk and makes statistics and catalogs of searched files or duplicate files. The file-management tools allow users to move, copy, delete, rename, launch, or color files individually or in groups. 512K min. memory. $99. Midnight Software, 303/730-3376; fax 303/934-8703.



DupLocator

easyPrint
An application that lets users create icons to represent printers, allowing users to switch printers by double-clicking on the appropriate icon. The icons can also accept Apple events from other applications, and users can drag documents to the icons in System 7 to

continues

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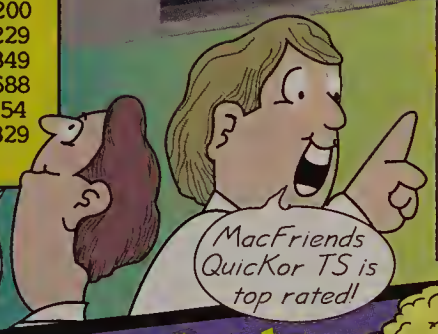

	Overall Performance	Street Price
Texas Instruments microLaser Turbo		$1950
MacFriends QuicKor TS		**$1588**
Texas Instruments microLaser Plus PS35		$1400
Dataproducts LZR 960		$1800
GCC BLP IIS		$2599
Hardware That Fits TealTech Laser		$1695

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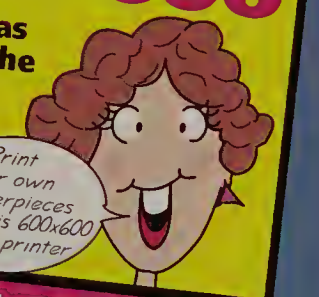

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Expert Astronomer
A program that displays stars and planets in color on screen as they would appear in the sky from a selected location; users can get information by pointing and clicking on them. The program tracks significant events, like eclipses, on screen with time-lapse settings. The application can display more than 9000 celestial objects and includes *Introduction to Astronomy*, a guidebook for beginners. 2MB min. memory. $49.95. Expert Software, 305/444-0080; fax 305/443-3255.

ExpertWriter
A desk accessory for creating letters, faxes, and memos quickly that includes a word processor, address book, spelling checker, and envelope printer. The program can print labels or envelopes with postal bar codes, and the spelling checker includes 93,000 words. Also included are samples of letterhead, fax sheets, and memos that users can adapt. 1MB min. memory. $49.95. Expert Software, 305/444-0080; fax 305/443-3255.

Fastedit/CT
A plug-in module for use with Adobe Photoshop that enables users to manipulate high-resolution Scitex CT–format image files. With Fastedit/CT installed, Photoshop users can open and edit sections of Scitex CT image files and then append the edited areas back into the original file. 2MB min. memory. $239. Total Integration, 708/776-2377; fax 708/776-2378.

Fastedit/CT

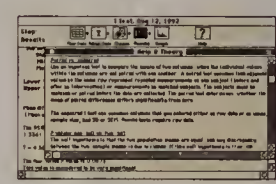
Freedom of Press Professional
A PostScript-language interpreter exclusively designed to support the Canon CJ10 Color Bubble-Jet Copier that, combined with a CJ10 IPU Kit for Macintosh, allows the copier to work as a color PostScript printer with a resolution of up to 400 dpi. The package includes 35 scalable outline fonts and supports Adobe Type Manager and Adobe Type 1 fonts; it also supports the Adobe-defined PostScript color extensions for 24-bit and 32-bit images. 4MB min. memory. $895. Custom Applications, 508/667-8585, 800/873-4376; fax 508/667-8821.

Funk and Wagnalls Standard Desk Dictionary for the Macintosh
An electronic dictionary with definitions for over 103,000 root words that can be invoked via a hot key from within any application. Users can copy and paste definitions into word processors. The program can perform wildcard, anagram, batch-file, and reverse searches and includes a dictionary that translates 1000 common words into 26 languages. The dictionary also provides sections on computer terms, abbreviations, biographies, and it includes a gazetteer as well as a secretarial handbook. 1MB min. memory. $99.95. Inductel, 408/866-8016, 800/367-4497; fax 408/243-1762.

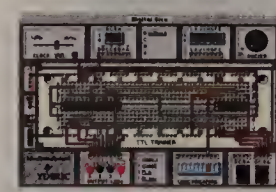
Info-Mation
A personal information-management program that lets users enter, change, or display calls, meetings, and tasks on a single screen; automatically warns them of scheduling conflicts. Users can stick notes anywhere on screen and can keep an unlimited amount of phone numbers for any one contact entry. Import and export managers allow files from other programs to be entered, and the program has monthly and weekly (five-day or seven-day) views. The project-planner module can be used to define, prioritize, and delegate tasks across a network. 2.5MB min. memory. $189. Personal Info-Mation Management, 510/559-4211, 800/444-4746; fax 510/525-7644.

Info-Mation

InStat Mac
A statistics package for students and scientists that can calculate mean confidence intervals, perform paired and unpaired t-tests, analyze contingency tables, and do linear regressions and correlations. The software can also calculate exact P values from z, t, r, F, or chi-square, and perform a variety of other statistical analyses. 1MB min. memory. $95. GraphPad Software, 619/457-3909, 800/388-4723; fax 619/457-8141.


InStat Mac

MacBreadboard
A transistor-transistor logic (TTL) trainer designed to work the way that real hardware trainers used in digital circuits courses do. Trainer allows users to manipulate chips and wires on screen. A user selects a chip from a menu by number, places it on the board, and draws wires to connect a power supply, DIP switches, LEDs, and so on. Timing diagrams can be displayed and printed for simulated circuits, and a snapshot of the breadboard can also be printed. Devices available in the application include 30 two-state TTL devices, a buzzer, logic indicators, DIP switches, and a logic probe. 512K min. memory. $59.95. Yoeric Software, 919/644-1620.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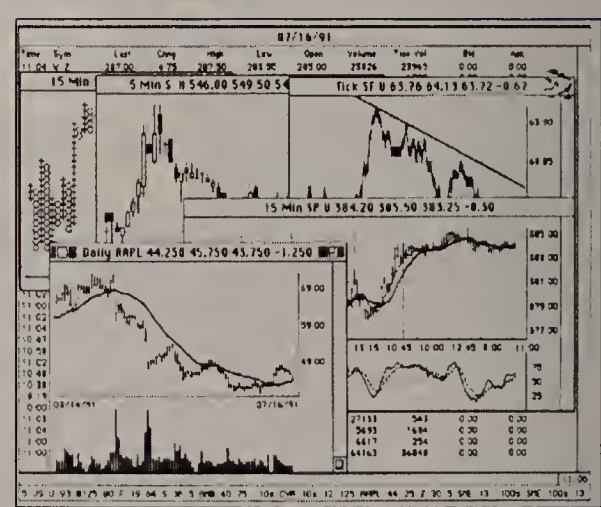
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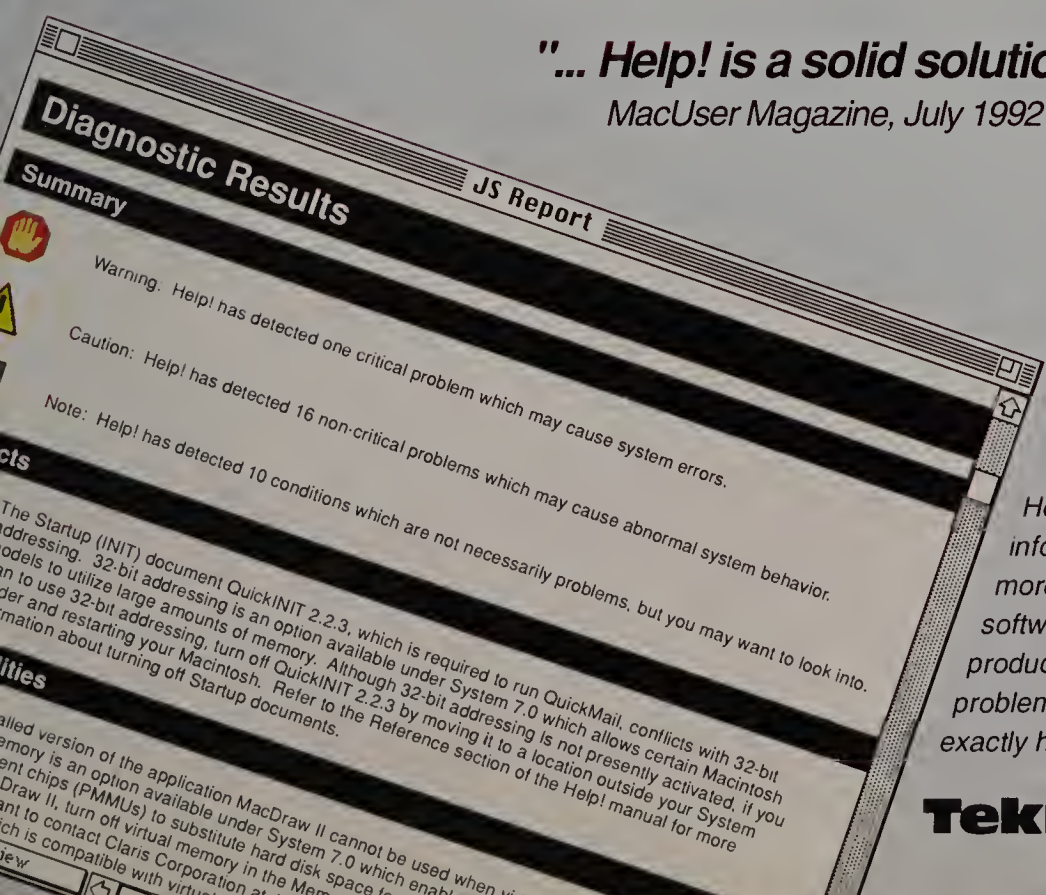

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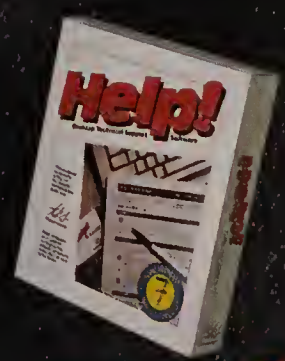

MacUser
April '92

Help!™

Every Mac User Needs It.

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Circle 18 on reader service card

MacIntercomm
A telecommunications program that distributes processing power among other applications running at the same time to enable users to perform file transfers in the background. The package includes a scripting language that can be fully compiled and a built-in script editor that handles debugging; many example scripts are included too. An Auto Dial window keeps track of the phone numbers that a user calls and can automatically redial a number until a connection is made; a Smart Dial feature adjusts phone numbers based on the local area code. The application supports terminal emulations such as VT102, VT220, and TTY, as well as a variety of file-transfer protocols. 1MB min. memory. $195. Mercury Systems, 310/553-0881; fax 310/553-1291.

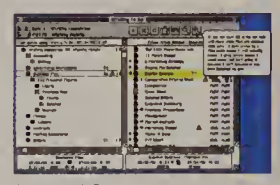
Mainstream Newscast for QuickMail
A news-delivery system, for use with the company's satellite-based network, that distributes news gathered from a variety of services over a network via CE Software's QuickMail. Users subscribe to news services such as Reuters, AP, and UPI by paying from $50 to over $1000 per month. The software monitors incoming data from the wire services and sends stories to users based on lists of keywords. 1MB min. memory. $695. Mainstream Data, 801/584-2800; fax 801/584-2831.

Mainstream Newscast for QuickMail

NetDraw
A clip art package created for networking, systems, and communications professionals that includes over 170 objects in six categories: computing, WANs, LANs, telephony, personal computing, and patching and cabling. The software includes templates and individual symbols, saved in PICT, MacDraw, and Canvas formats. 1MB min. memory. $99.95. Network World, 508/875-6400, 800/643-4668; fax 800/756-9430.

Pharmacology TextStack
An electronic version of *Pharmacology*, a textbook written by Theoharis C. Theoharides; includes the complete text, figures, diagrams, and tables appearing in the book, as well as a quizzing module. Each chapter begins with a statement of objectives and ends with a self-testing section. A set of key tables presenting the core concepts of pharmacology, a comprehensive glossary of terms, and definitions of terms are also included. Users may clip text and save it in a clippings file and mark sections of the documents for reference. Program requires HyperCard 2.1 or later version. 2MB min. memory. $135 per workstation. Keyboard Publishing, 215/832-0945, 800/945-4551; fax 215/832-0948.

PowerMerge
An application that lets users automatically update files between a desktop Mac and a PowerBook by connecting the two over a network. Users designate which files, folders, or disks should be updated, and whenever the two machines are connected, the software updates any files that have been changed. PowerMerge requires System 7, runs in the background, and keeps a history log of all transfers. 1MB min. memory. $129. Leader Technologies, 714/757-1787; fax 714/752-5960.

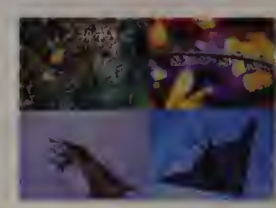

PowerMerge

Quick Ship
An application that calculates UPS shipping charges and is also a manifest system that handles domestic and international shipping. The program finds UPS rates and zones from the zip code entered for shipments in the United States, allows for all UPS shipping types, and calculates Saturday deliveries. It also prints COD tags, shipping labels, UPS manifests, and summary reports. Quick Ship keeps client shipping histories and customer and client databases. 1MB min. memory. $195. ShopKeeper Publishing International, 904/222-8808; fax 904/668-9916.

RenderPro
A distributed rendering engine that works with StrataVision 3D to divide rendering tasks among networked Macs. Users can simultaneously employ the processing power of all the CPUs on a network to render a 3-D image or animation. The software consists of three applications: Task Manager is a communication and control application; Render Tune Up is a troubleshooting and installation module; and RenderPro is the rendering engine. 4MB min. memory. Three-pack $695; ten-pack $1495. Strata, 801/628-5218, 800/678-7282; fax 801/628-9756.

RenderPro

ScreenSavor
A module for use in Berkeley Systems' After Dark screen saver that lets users display one or four 8-bit or 24-bit images on screen when After Dark goes into screen-save mode. The package comes with 12 digitized images taken by photographers; other images can be added. 4MB min. memory. $49.95; additional image sets $39.95 each. MIFP Development,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A simplified version of the company's ShowScape professional script-writing software package. Each document created by ShowScape Junior is made up of preformatted shot units that are automatically numbered. Shots may be deleted, inserted, cut, and pasted. The software is a module that runs within WordPerfect. 1MB min. memory. $50. Lake Computframe, 914/941-1998; fax 914/941-2043.

Storybook Weaver
A creative-writing tool that is designed for children ages 6 to 12 to create their own storybooks by selecting pictures, sound, music, and characters and by typing words. In the application's picture window, users can select from 468 scenery combinations, more than 650 objects, 36 different sounds, and 12 musical tunes. Objects can be enlarged, reduced, flipped, and colored; categories include people, real and make-believe animals, vehicles, trolls, dragons, and Arabian princes. Storybooks can be printed or viewed on another computer. 1MB min. memory. $49.95. MECC, 612/569-1500, 800/685-6322 ext. 549; fax 612/569-1551.

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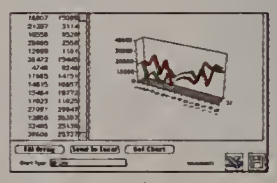
A conversion calculator program that handles a variety of computational and conversion functions useful to people working with audio and video recording systems. The program converts between all forms of SMPTE time code, sequencer timing, delay settings, note frequencies, chord intervals, sample rates, tape speed, and general units of time and distance using the English or metric system. The program can also do mixed-unit computations. 1MB min. memory. $69.95. Harmonic Systems, 415/485-5242; fax 415/485-6018.

SuperPlot
A plotting library that programmers can link into a program they are developing to plot data generated by a user's application and to edit, print, export, and save the plot. You invoke SuperPlot with a procedure or subroutine call; SuperPlot then hides the calling program's menu bar, displays its own menu bar, creates a new window, and plots the data specified. When a user quits SuperPlot, control is returned to the calling program. Plots can be exported as PICT files. 1MB min. memory. $195. SuperSoft, 801/225-4356, 800/827-4351; fax 801/226-6276.

System 7 Pack
A package for use with ACIUS's 4th Dimension that lets users send Apple events to and from 4D. Users can open or print documents in other applications while in 4D and can also terminate any application. The package has extended support for applications that offer scripting, such as Frontier and QuicKeys, enabling users to invoke almost any



System 7 Pack

4D command from these programs. 4MB min. memory. $129. ISIS International, 818/788-4747.

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A group-information manager, designed for the sales automation market, that combines a contact manager, personal calendar, meeting scheduler, electronic mail, and list processor. An optional word processor provides mail merge capabilities, and a spreadsheet module is also available. The document database lets users file each document and proposal under several different categories. 2.5MB min. memory. Up to $289, depending on options chosen. ZCo Corp., 603/888-7200; fax 603/888-8452.

Time Navigator
A personal-information manager that runs in HyperCard and enables users to store information for any date, tag entries with user-defined labels, prioritize to-do items, and set alarms for any entry. Users can generate reports by label or subject, and a project-planning window enables users to enter and update tasks and milestones for any project. Requires HyperCard 2.0 or later version. 1MB min. memory. $28.95. Arch Cape Software, 301/680-8004.

Tree
Software that generates images of virtually any kind of tree by letting users adjust parameter values for the tree structure, color, and geometry. Random trees can also be created, as well as trees of any age and in any season. The images can

Tree

be saved in PICT format for use in other applications. 2MB min. memory. $295. Onyx Computing, 617/876-3876; fax 617/868-8033.

UpDiff
An application that detects and encodes the differences between any two files, saves the differences, and then allows users to update older versions of files with these differences. UpDiff works with word processors, spreadsheet programs, databases, and graphics applications, and it can also be used to distribute new versions of applications over a network. 1MB min. memory. $169. KyZen Corp., 609/354-3863; fax 609/354-9009.

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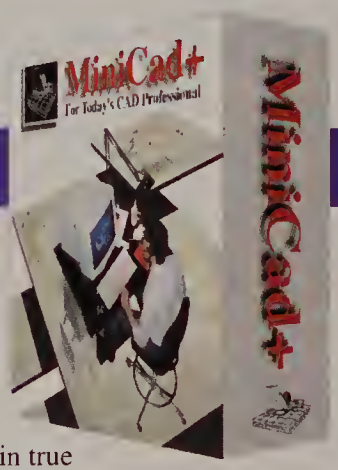

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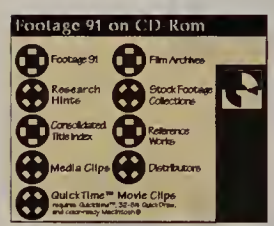

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BOOKS

Dan Shafer's First Book of Frontier
A guide to UserLand Software's program Frontier, a system-level scripting language. The author also wrote the user and reference manuals for Frontier. The more-than-125-page book is subtitled *25 Things You Can Do with Frontier that Would Be Hard or Impossible Without It.* The book comes with a disk that contains several utilities, as well as documentation for the software. Written by Dan Shafer. $24.95. The Reader Network, 415/367-1221; fax 415/367-1073.

Hayden's PowerBook Power Book
A book written for PowerBook users on issues, utilities, software, and add-on accessories that includes a vendor guide. The book also discusses applications that are "lean" enough to run on the Mac PowerBook, as well as other topics such as integrated applications. Written by Ross Scott Rubin. $24.95. Hayden, 317/573-2500, 800/428-5331; fax 317/573-2583.

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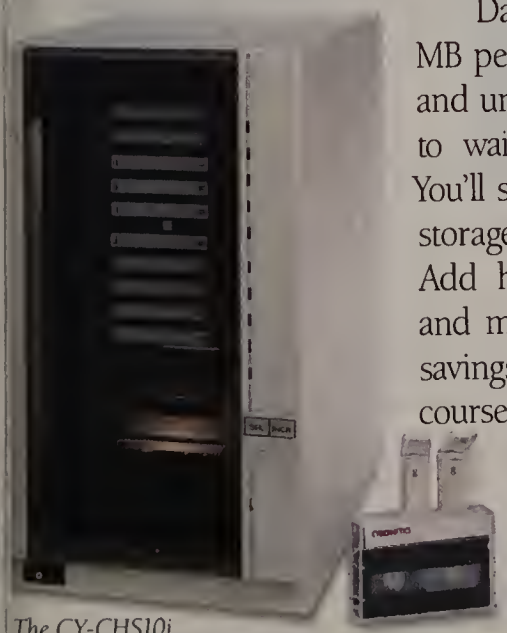

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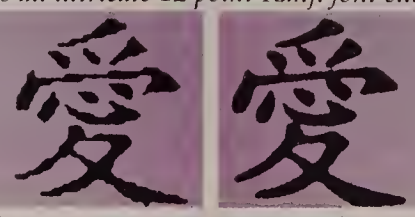

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Questions and Tips from Macworld Readers

BY LON POOLE

WHAT DO RUBBER BANDS, shirt cardboard, photoreactive glue made for stained glass, and refills for electric erasers have in common? They can all be used to hold a SIMM in place when one or both of its retaining clips are broken. Michael T. Fussell of Missoula, Montana, favors the cylindrical eraser refill because it is nonconducting, it is nonskid enough to stay in place, and it is sufficiently springy to withstand vibration without falling out. It also looks neat. He buys an eraser refill from an office supply or drafting supply store, cuts a piece about ¼-inch long, and wedges it lengthwise between the SIMM with the broken clip and the SIMM in front of it. Fortunately Fussell has never broken a clip on the front SIMM. (For information about the other methods of restraining SIMMs with broken clips, see *Quick Tips*, March 1992 and July 1992.)

HyperCard Magic

Q. I was reading "Insights on HyperCard 2" (September 1991) and it says *Quick Tips* explains how to fix the Home stack's Preferences card to permit setting the user level to Painting, Authoring, or Scripting. I looked through *Quick Tips* but can't find the reference. Please advise.

Andrea Hawkins
Pleasanton, California

A. This information, which originally appeared in the April and August 1991 issues, is worth repeating. The version of HyperCard bundled with every Macintosh is meant for browsing and typing, so the Home stack's Preferences card doesn't show the higher user levels you mention. To reveal the higher levels, go to the Preferences card (choose Last from the Go menu), display HyperCard's message box (choose Message from the Go menu), and type the command **magic** and press return. Typing **magic** a second time hides the higher levels again.

You can set HyperCard's user level from any card by typing a different command in the message box. Typing **set userlevel to 5** sets the user level to Scripting; substitute the number 4 for Authoring (creating buttons and fields), 3 for Painting, 2 for Typing, or 1 for Browsing. The HyperCard booklet included with a Mac doesn't explain how to use the higher user levels. A number of books are available on the subject, ranging in price from $20 to $35. Another option is the $199 HyperCard Development Kit from Claris (408/727-8227). This kit contains five manuals and 19 example, reference, and utility stacks not bundled with the Macintosh.

Missing RAM

Q. I have consistent trouble with RAM management on my 5MB Mac IIsi running System 7.0.1. For example, while using Microsoft Word 5 (whose memory size I have reduced to 1MB) I might switch to the Finder to check how much memory I have available. The About This Macintosh command usually reports system software at slightly over 2MB; add 1MB for Word, and I should have 2MB available. Instead I have only about 800K. This happens with other applications as well. The RAM is very fickle; sometimes a lot of memory is unaccounted for and other times only a few hundred kilobytes. Do you have any idea what the problem is?

Daniel Hoffer
Brookline, Massachusetts

A. Look closely and you will see that About This Macintosh tells you the size of the largest unused block of memory but not the total amount of unused memory. Your Mac may have several unused blocks of memory interspersed among the used blocks of memory (see "Memory Pie"). This condition, called fragmented memory, occurs often, unless you scrupulously quit application programs and desk accessories in exactly the reverse of the order in which you opened them.

Fragmented memory, automating FileMaker Pro entries, audible feedback for QuicKeys, and more

You can consolidate fragmented memory by quitting all open applications and desk accessories and then opening the programs and DAs again. Restarting the Mac also fixes fragmentation and may reduce the amount of memory used by the system software. To avoid memory fragmentation, carefully plan the order in which you open and quit programs. Open the applications and DAs you're least likely to quit first; open last those you're most likely to quit. When you need more memory to open a program, quit the most recently opened application or DA. If that doesn't free up enough memory, then quit the next most recently opened program, and so on. This method frees up a contiguous chunk of memory. Quitting programs helter-skelter leads to memory fragmentation.

In theory Apple's System 7 Tune-Up 1.1.1 is supposed to improve handling of low-memory situations, but it actually promotes fragmentation by encouraging you to let the Finder decide which programs to quit when you need more memory to open another program. Because the tuned-up Finder considers only program sizes rather than the order in which they were opened, it may, for example, quit a 1500K program to open a 1200K program, creating a 300K memory fragment. The Finder always asks your permission before quitting programs, so you can decline if you want to minimize fragmentation. Tune-Up also speeds up printing and fixes minor bugs in both System 7.0 and 7.0.1. It is available from Apple dealers, user groups, and online information services.

Incidentally, About This

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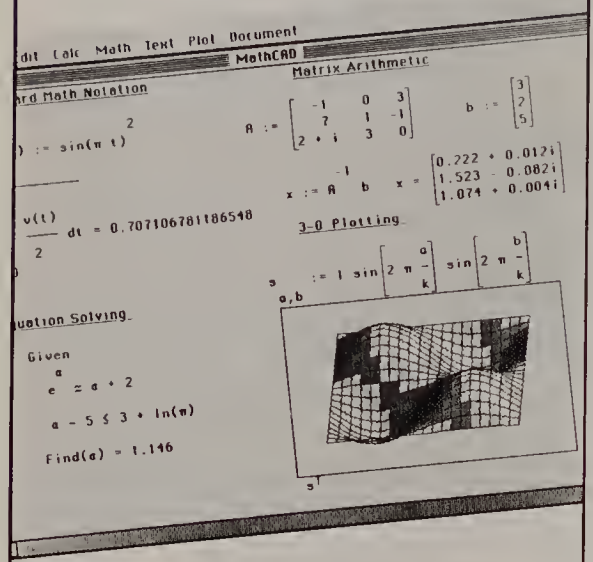

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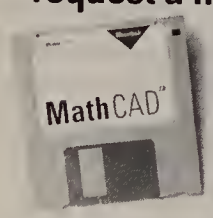

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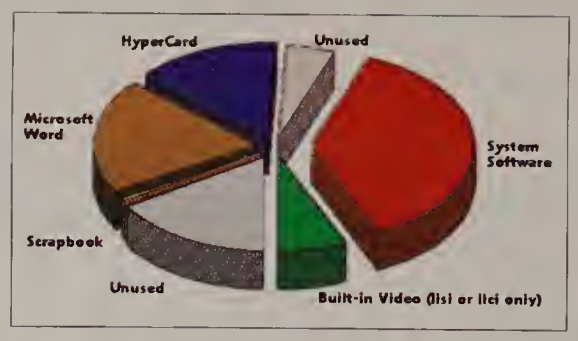

Memory Pie As you open and quit programs, the unused portion of the Mac's memory tends to become fragmented into multiple small blocks. You can open a program only if there's a single block big enough to handle that program's memory needs. System 7 can neither consolidate fragmented memory nor open one program in multiple blocks of memory.

Macintosh does not account for as much as 350K of RAM that a Mac IIsi or IIci reserves for built-in video. (Other Mac models do not use significant amounts of main RAM for built-in video.) You can use the Monitors control panel to reduce the amount of memory a IIsi or IIci reserves for built-in video, but not by changing the ordinary color settings. You must press the option key while clicking the Option button in the Memory control panel to bring up a special dialog box in which you set the maximum number of colors or grays to 256, 16, 4, or black and white (reserving about 350K, 190K, 126K, or 94K).

Quick Size Change

Q. Small text is hard to work with on screen. Is there a quick and easy way in Microsoft Word to enlarge the type (say, to Helvetica Bold 12) while I work on the screen, and then switch back to my regular style (Helvetica 10) when I'm ready to print?

Art Dechene
Brookings, Oregon

A. If all text in the document is the same size, select it all by pressing ⌘-A (⌘-option-M in Word 4) and then change the size by choosing from the Font menu or the pop-up menu in Word 5's formatting ribbon. If the document contains different text sizes, you must use another method.

My favorite method involves Word's style sheets and a command not normally on any Word menu, Redefine Style From Selection. You can add that command to the Format menu (or another menu of your choice). To do that, you choose Commands from the Tools menu (Edit menu in Word 4), bringing up a dialog box that lists all of Word's commands. Select the command Redefine Style From Selection from the scrolling list in this dialog box (typing the letter *R* scrolls quickly to the commands beginning with *R*; in Word 5 typing the first part of the command name selects the command in the scrolling list). Then click the Add button to put the selected command in the menu. If you prefer, you can choose any Word menu from the Menu pop-up (and in Word 5 a location on that menu from the Add Below pop-up) in this dialog box before clicking the Add button. You can also assign a keyboard shortcut for the command. After adding the command to a menu, dismiss the dialog box by clicking its Close button.

When you want to change the format of all text that shares a particular named style (such as Normal, heading 1, heading 2, or footer), you select any word having that named style and make your desired changes to it by choosing from the Font and Format menus, by typing ⌘-*key* shortcuts, or by clicking one of the controls in the formatting ribbon or formatting ruler. Then choose the Redefine Style From Selection command. Word promptly applies your changes to all text having the same named style. In so doing, Word does not override deviations from the named style's previous definition. For example, changing the Normal style from 10-point to 12-point does not affect instances of Normal-style text that you previously selected and set to 14-point; those instances of text remain 14-point. Word propagates your changes to any named styles based on the particular named style you changed. For example, changing Normal style from 10-point to 12-point changes all other named styles that are based on Normal and that are 10-point. In this example, Word would not change a named style that is based on Normal but is 14-point.

Instead of using the Redefine Style From Selection command, you can change styles directly in the Style command's dialog box. To bring up that dialog box, either choose the Style command from the Format menu, double-click the style name at the bottom of the Word window next to the left scroll arrow, or type the keyboard shortcut ⌘-T. For more on styles, style sheets, and the Style command, see the Word manual.

Selectively Tracking Deleted Files

TIP Here is a tip for people using data-recovery software such as Norton Utilities for Macintosh (Symantec Corporation, 408/252-3570 or 800/441-7234) or MacTools Deluxe (Central Point Software, 503/690-8088) to track deleted files and thereby aid in their recovery. These programs track all deleted files, including the temporary files that appli-

continues

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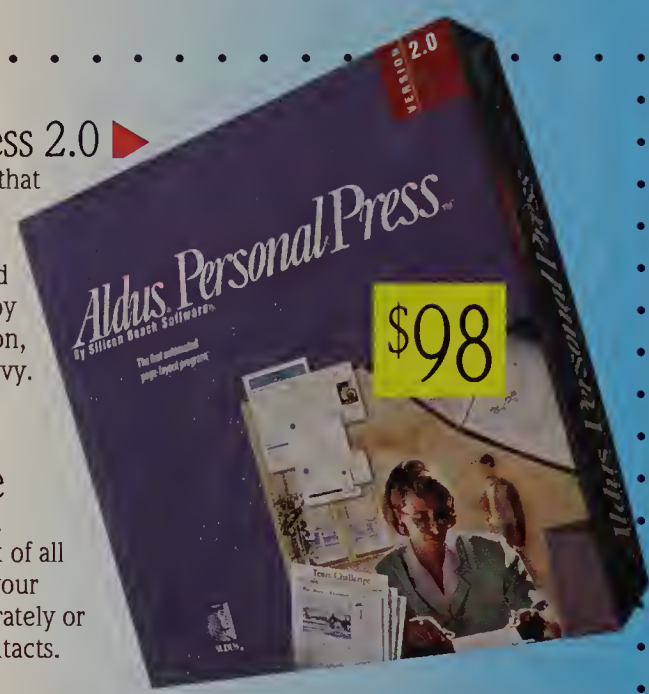

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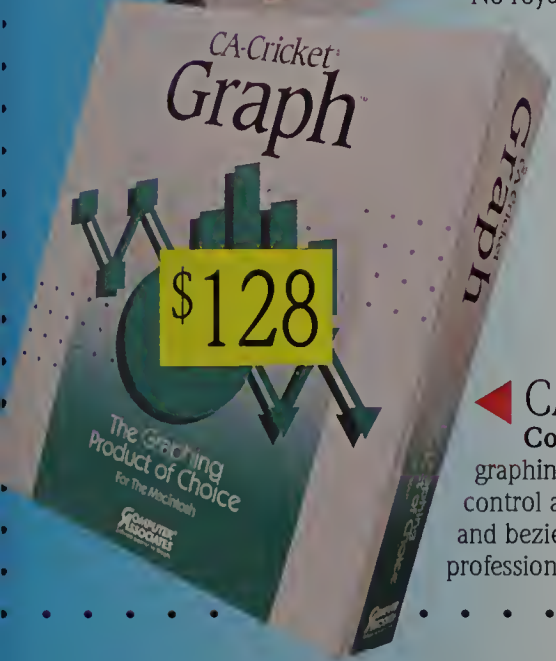

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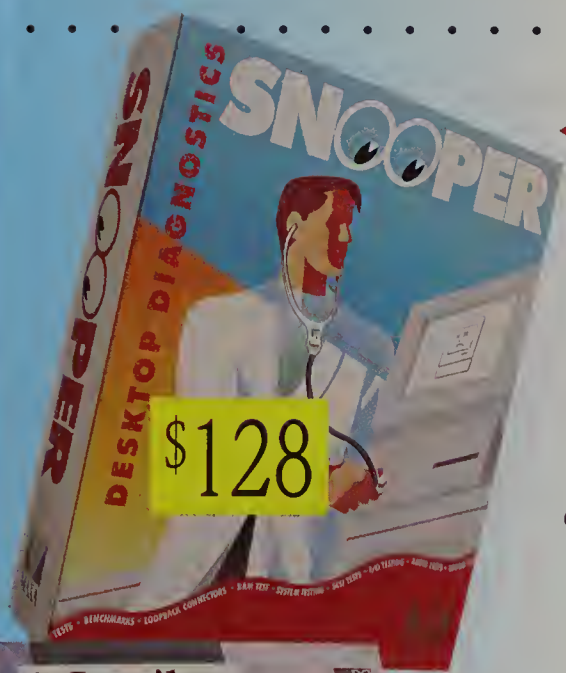

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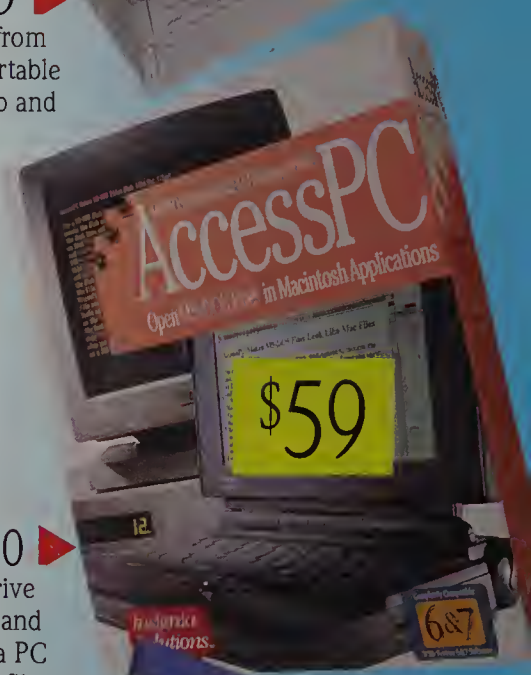

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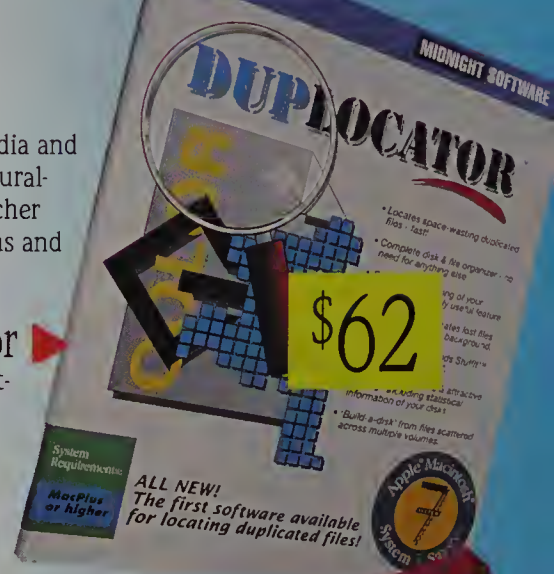

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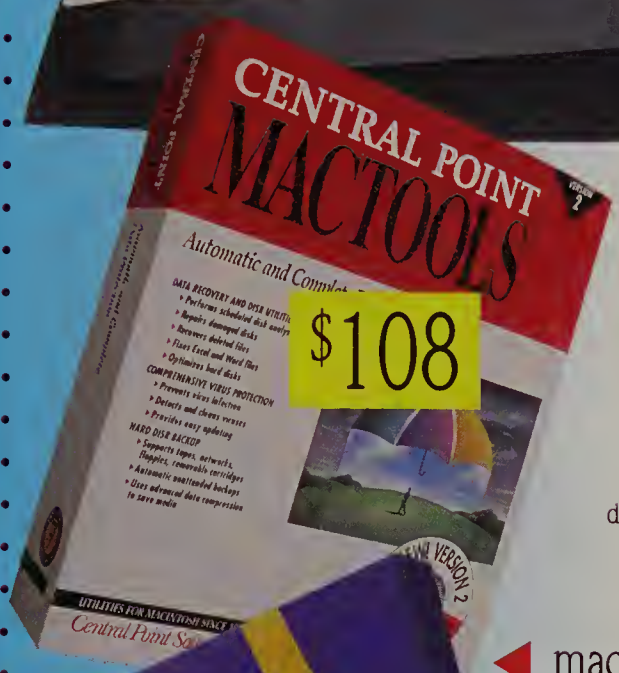

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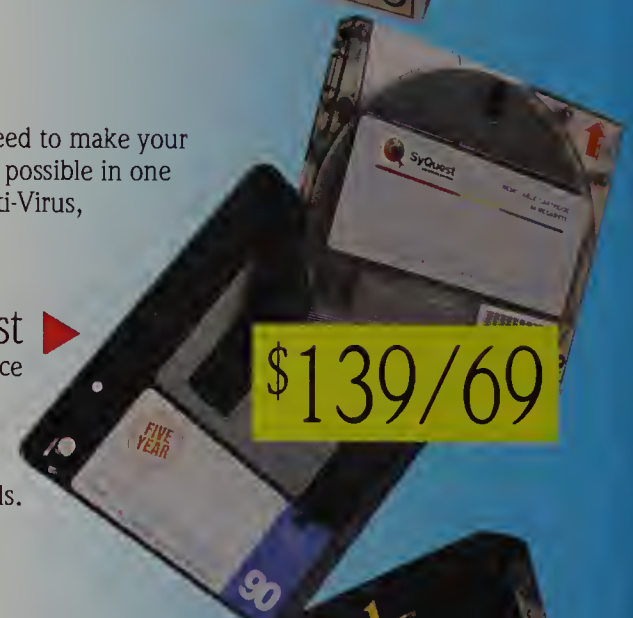

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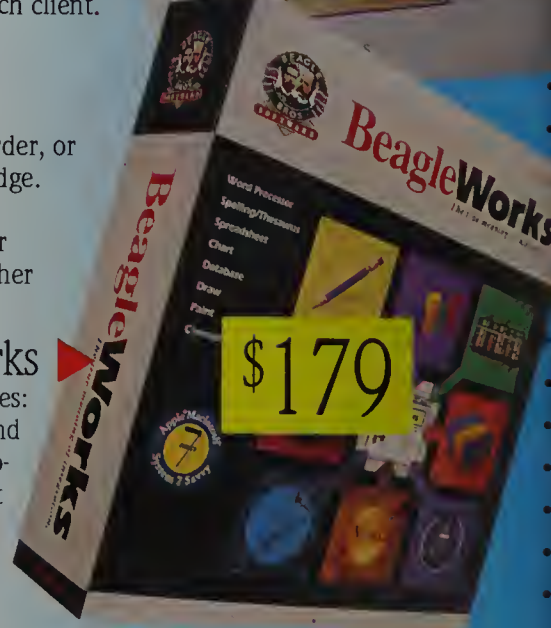

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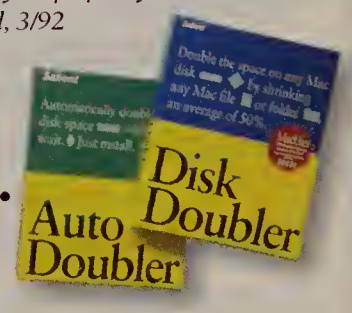

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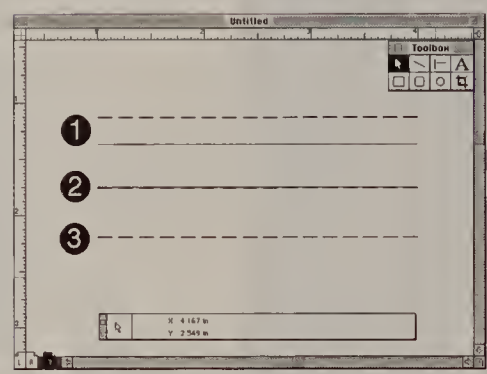
More PageMaker Line Widths

Although Aldus PageMaker is able to create solid lines in .5-point and hairline sizes, dashed lines are available only in larger sizes. To make a .5-point dashed line, Peter Johnston of Ithaca, New York, suggests that



you place a .5-point reverse line on top of a 1-point dashed line. (Aligning the lines is a little easier with PageMaker 4.2's Control Palette.) You can also use this technique to create other nonstandard line widths.

cation programs create and delete automatically and that spool files create when you print with background printing turned on. Spool and temporary files needlessly take up space on the list of deleted files, space better used for tracking files you drag to the Trash (and discard with the Empty Trash command in System 7). Eliminate the tracking of spool and temporary files by partitioning your hard drive. Put the System Folder in a partition by itself and put documents into one or more other partitions. Then set your data-recovery software to not track deleted files on the system partition.

Scott Allen Gruby
Coronado, California

This technique does not eliminate the tracking of all automatically deleted files. For example, Microsoft Word creates temporary files on the same volumes (disks or partitions) as the documents you're working on. Also, automatic-file-compression software such as AutoDoubler (Salient Software, 415/321-5375) creates temporary files on the same volume as the files it is compressing. The data-recovery software will continue tracking those automatically deleted files.

You can partition a hard drive with the aforementioned Norton Utilities or MacTools, or you can use disk-formatting software such as Hard Disk Toolkit (FWB, 415/474-8055), Drive7 (Casa Blanca Works, 415/461-2227), or DiskMaker (Golden Triangle Computers, 619/279-2100).—L.P.

Audio Confirmation After you have created a new QuicKeys sequence (or you have opened an existing sequence), you can add a recorded sound from the System file by choosing Sound from the Extensions submenu of the Define menu inside QuicKeys' Sequence dialog box. Each time you use the sequence, you hear the sound signaling the end of the sequence.

Noisy Feedback

TIP Using a QuicKeys sequence, you can give your Macintosh noisy feedback. First you get your hands on a goofy sound or record one yourself. Put the sound into the System file. In QuicKeys (CE Software, 515/224-1995), create a new sequence or open an existing sequence and append a QuicKeys Sound extension for your sound (see "Audio Confirmation"). Some ideas: When I press F1, F2, or F3 (the extended-keyboard function keys that by convention correspond to the Cut, Copy, and Paste commands), my Macintosh reacts with the appropriate spoken message, "cut," "copy," or "paste." Similar spoken responses follow after setting the monitor to a certain number of colors or grays, choosing a printer (with QuicKeys' Choosy extension), switching System 7's file sharing on or off, and so forth.

Stefan Bracke
Deurne, Belgium

Opening Canceled

TIP Once I accidentally chose an application from System 7's Apple menu. Horribly distraught because I really didn't want to open that program, I quickly hit ⌘-period (.) several times (this comes from my experiences with HyperCard), and miraculously the Finder stopped opening the program! Pressing ⌘-period also halts opening initiated by double-clicking, choosing Open from the Finder's File menu, or dragging a document and dropping it on an application icon.

Jeremy and Andy Monat
Indianapolis, Indiana

⌘-period takes effect only if you press it within the first few seconds after opening.—L.P.

continues

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Reversed Text

TIP QuarkXPress has trouble producing white text on a black or gray paragraph rule when printing to a non-PostScript printer. The dark paragraph rules come out fine, but the white text doesn't print—although it looks fine on screen. Here's a workaround. After reversing text out of a paragraph rule (as described in Quark's manual *Using QuarkXPress*, page 6.62), use the Modify command to set the background color of the text box to None. Next draw an empty picture or text box large enough to completely cover the reversed text. With the empty box selected, use the Runaround command to set the empty box's runaround to None, the Modify command to set the empty box's background color to White, and the Send to Back command to send the empty box behind the text box containing the reversed text. The white text will now print correctly.

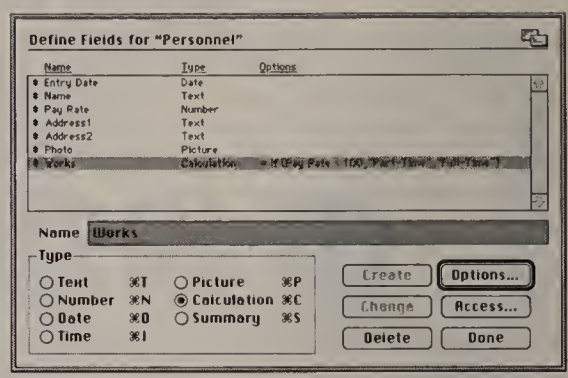
Ward Barnett
Minnetonka, Minnesota

Automated FileMaker Entries

TIP Claris FileMaker Pro's manual tells you how to make FileMaker Pro automatically enter a value for all new records you create in a database. (You click the Options button of the Define Fields command's dialog box, and then you specify the value you want automatically entered.) What if you create a new field after you already have hundreds of records? FileMaker Pro makes no provision for automatically entering a value in a new (or old) field for all the existing records.

I stumbled onto a method for having FileMaker Pro do just that. For example, suppose you have several hundred records and you want to create a new field, Entry Date, that automatically records the date each new record is entered. You also want a date to appear in all the file's old records, and you want that date to be earlier than today's date. You accomplish this by creating a calculation field with a formula such as Date(6,20,1992). FileMaker Pro uses that formula to calculate a date value and places that value in the new calculation field for all existing records. When FileMaker finishes assigning that date value to all existing fields, change the calculation field into a date field so you will be able to enter dates (rather than calculate them) for new records. A task that could have taken more than an hour is finished in a couple of minutes.

You can use the same basic method to calculate different initial values for different types of records. For example, suppose your personnel file needs a new field to identify full-time or part-time status, and



Initial Values You can have FileMaker calculate initial values of a new field (the Works field here) for existing records. After FileMaker calculates the initial values, you can then change the new field to its permanent type (Text for the Works field), and you click the Options button to add a list of standard values from which to choose when entering new records.

you know that all employees now on file are part-time if paid hourly or full-time if paid monthly. Simply create a new calculation field whose formula uses an If statement to assign an appropriate value for the new field based on the current value of an old field (see "Initial Values"). The formula **If (Pay Rate < 100,"Part-Time", "Full-Time")** assigns the text value Part-Time if the field Pay Rate is less than 100 or the text value Full-Time if more (your hourly employees make less than $100 per hour and your salaried employees make more than $100 per pay period). After FileMaker completes the conditional calculations for all existing records, you use FileMaker's Define Fields command to convert the calculation field to a number, text, or date field according to the type of data it contains. You can also use the Define Fields command to add a list of standard values for the field; they will aid in entering new records later. (Click the Options button of the Define Fields command's dialog box, and then specify the value list.) In the personnel example, you would convert the new calculation field to a text field with a value list containing the entries Full-Time and Part-Time.

Jim Melko
Dayton, Ohio

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LON POOLE answers readers' questions and selects their tips for this monthly column. His two most recent books are *Amazing Mac Facts* (Microsoft Press, 1991), a collection of the best published tips; and *Macworld Guide to System 7* (IDG Books Worldwide, 1991).

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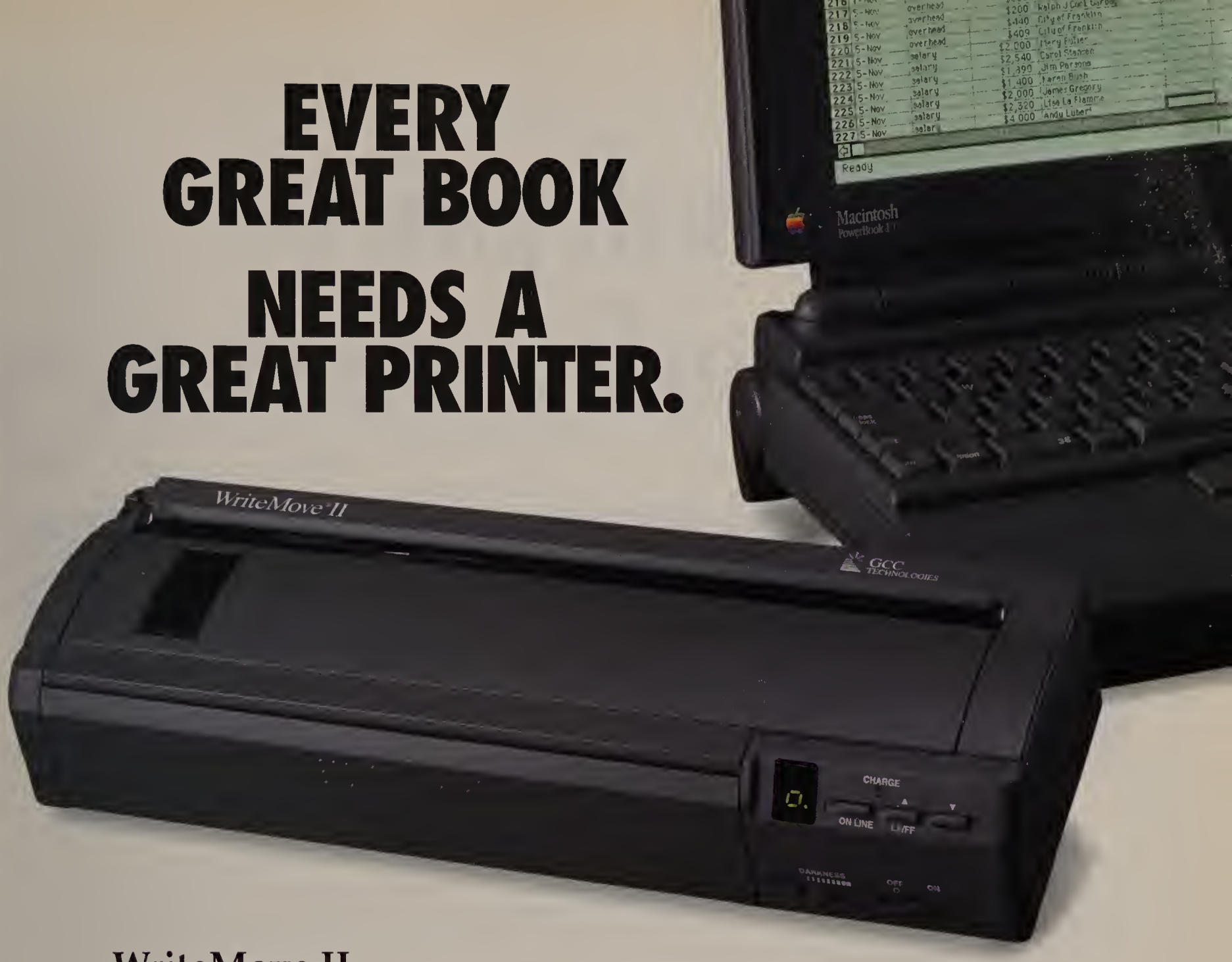

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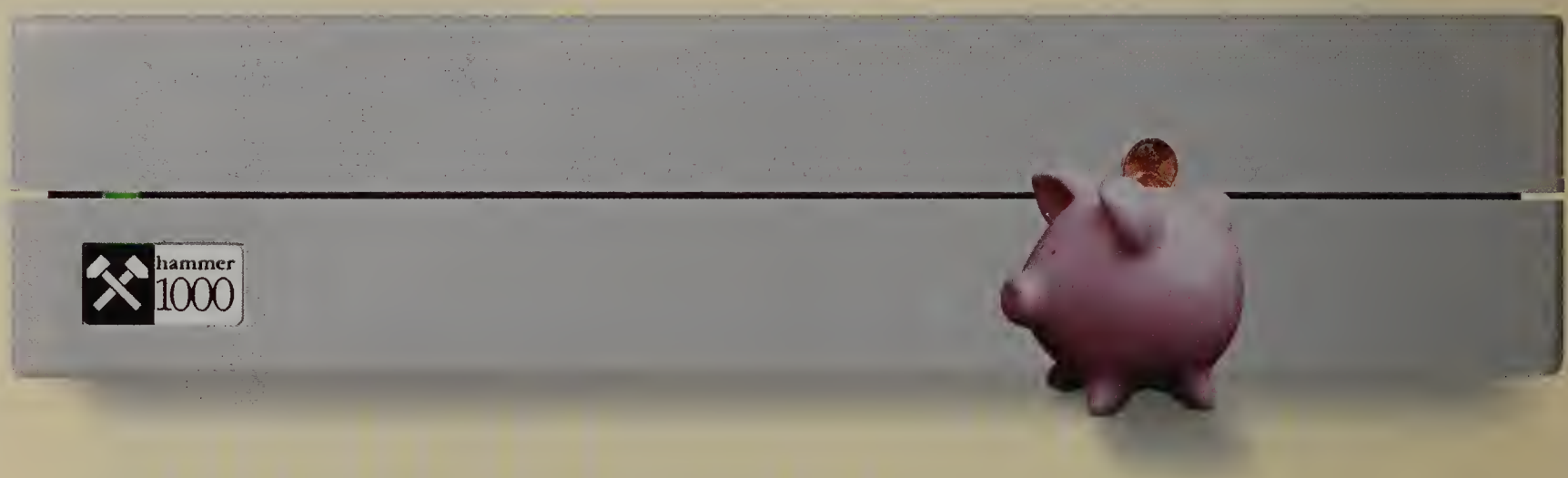

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Small-Business Accounting

BY JIM HEID

FOR A SMALL BUSINESS, ACcounting is a necessary evil. It's necessary because any business's bottom line benefits from accurate record keeping, prompt billing, and balanced accounts. But it's evil because it takes time that you'd probably otherwise spend doing your job. It's a rare small business that has a staff accountant, so you have to periodically don a bean-counting cap and wrestle with accounts payable and receivable, estimated tax payments, payroll, and other mundanities.

To many people, the only thing worse than practicing accounting is learning about accounting, and the result is usually informal, erratic billing practices and shoddy records. Besides being a nightmare at tax time, shoe-box–based accounting systems can hurt profits. If a contractor sends out bills only when the shoe box overflows, he's losing money and giving clients interest-free loans. If a consultant records time spent with clients on scraps of paper, she loses money every time a scrap is misplaced. If a store waits until a product is out of stock before ordering more, it's losing sales every time a customer is turned away.

The selection of Macintosh accounting programs is larger than ever, with many programs geared toward the needs of small businesses. All programs handle accounts payable and receivable. Others add inventory-management features—ideal for retail or mail-order operations. Some also handle payroll.

These programs can help, but they are not sure cures for fiscal chaos. Forget plowing into an accounting program without opening the manual—you will get lost within seconds and give up within minutes. It also helps to have a familiarity with basic accounting concepts, because too many programs' manuals assume that you already know how to count beans. If you really want to be prepared for electronic accounting, you might consider taking a course in small-business accounting.

To get you started, I'll present an overview of basic accounting concepts and describe the kinds of features accounting programs provide to simplify the process. After digesting the information here, see "Balancing the Books," our overview of accounting programs in this issue, to get more-detailed information on what individual packages offer.

Accounting Basics

ACCOUNTING PROGRAMS ARE REALLY database managers whose data-storing and reporting features are tailored to the task of managing money—much like the personal finance programs I looked at in last March's column. Indeed, for simple small-business accounting, you might find a personal finance program such as MECA Software's Managing Your Money, Intuit's Quicken, or Survivor Software's MacMoney easier to use than a business accounting package. All three programs' manuals show how to apply them to small-business accounting. Quicken also handles payroll, and MacMoney accepts Survivor Software's invoicing and accounts receivable add-on called InvoicIt.

You need something with a bit more punch? Prepare for a journey into The Jargon Zone. The accounting world has its own language, cloaking in buzzwords familiar activities like paying bills and cashing checks. It's the lingo that makes accounting intimidating to many people, but once you get past it, the basic concepts behind accounting aren't all that difficult.

The goal of any accounting system is to help you keep track of what you have—your *assets*—and what you owe—your *liabilities*. Assets include income, money in the bank, and equipment. Liabilities include bank loans, bills, and rent. By tracking your assets and liabilities and enabling you to analyze them, an accounting system helps you make sure that the latter don't outrun the former.

It may be stating the obvious, but the most important thing in an accounting system is accuracy. The accounting world has developed standard accounting practices whose built-in checks and balances help guard against inaccuracy. Foremost among them are the *balance sheet* and the *double-entry system*.

Keep your assets and liabilities straight—learn to balance your books on the Mac

Maintaining Your Balance

IMAGINE ASSETS AND LIABILITIES AS BEing at opposite ends of a seesaw. (I won't ask which end is heavier.) This seesaw is called a *balance sheet*, and it represents a snapshot of your financial condition at a given time. A typical balance sheet is a two-column report, with assets listed in the left column and claims against them—liabilities—listed in the right.

If you subtract what you owe from what you have, you wind up with what's left: the business's net worth, or *equity*. Hopefully, that's a positive figure. In any case, equity is always listed on the right side of a balance sheet, along with your liabilities. Why list equity along with liabilities? Because equity is, in fact, a claim—*your* claim—against the things owned by the business.

Assets and liabilities seesaw over time, but a balance sheet is always balanced—the total of assets always equals the liabilities and equity combined. This translates into an equation that forms the backbone of accounting: assets = liabilities + equity. This fundamental equation is so important that accountants have given it a pithy name: the accounting equation.

The Double-Entry System

THE ACCOUNTING EQUATION IS IMPORtant because it accurately expresses a fact of business life: that every transaction affects your assets and your liabilities and/or equity. A *double-entry* bookkeeping system puts the accounting equation to work.

The cardinal rule of double-entry accounting is the accountant's variation of Newton's law: for every debit there is an equal and corresponding credit. If you earn $1000, your assets increase by $1000 and your equity increases by $1000. If you borrow $10,000 to buy a piece of equipment, your assets increase by $10,000, but so do your liabilities.

The phrase "double entry" traces back to paper-based accounting, where you would write two separate entries in a

continues

ledger—one for the transaction's debit and one for its credit. When all the debit and credit entries were tallied, the totals would be identical—your books would be balanced. If the debit and credit totals weren't equal, the books were out of balance, and you knew that the ledger contained an error.

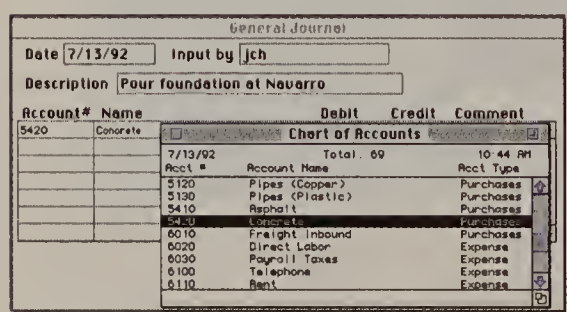
Accounting software eliminates the need to make two separate entries. When you make a credit entry, the accounting program knows to make a corresponding debit, and vice versa. There's one less entry and one less mistake to make. And, needless to say, the accounting program handles all the addition and subtraction.

Timing Is Money

MOST ACCOUNTING PROGRAMS USE A standard accounting practice called *accrual-basis* accounting. With accrual-basis accounting, income is registered when you send a bill (not when you receive payment), and expenses are registered when you receive bills (not when you pay them). Income and expenses are calculated and totaled at regular intervals called *accounting periods*—usually one year or one quarter.

The opposite of accrual-basis accounting is *cash-basis* accounting, in which you record liabilities when you incur them and record assets when you actually receive them. This method is straightforward but has a disadvantage: income and expense totals can be skewed by the calendar. For example, if you invoice a large job this December but don't receive payment for the job until next January, your 1992 income will be artificially low and your 1993 income will be artificially high. Accrual-basis accounting results in more accurate income figures for a given time period. (Certain types of businesses, including publicly held corporations, are required by law to use accrual-basis accounting.)

During each accounting period, you record information about each transaction in a *general journal*, a chronological listing of each transaction. With paper accounting systems, a journal is a book; with accounting software, the journal is typically a window (see "Keeping a Journal"). You can make entries directly in the journal window, but you may also make them indirectly. For example, if you have a retail business, you might use an accounting program that can create and print invoices. When you create an invoice, the accounting program automatically copies its total into your electronic journal.



Keeping a Journal An accounting program's general journal lets you create a chronological record of transactions. Here, a journal entry is being created in Softsync's Accountant, Inc. When you press the tab key with the insertion point in the Account# area, a chart of accounts window appears. You simply double-click on the desired account—no need to remember account numbers or repeatedly type account names.

These automatic pipelines between various parts of the program represent one of the big differences between manual and computerized accounting. With manual accounting, you often have to reenter the same information in different places: you might write a sales total on an invoice, and then copy it to your general journal. Accounting software spares you this manual labor and the errors that can accompany it. Enter information once, and the program automatically records—or *posts*—it in other relevant places. An accounting program knows that everything is tied to everything else.

Accounting Software Features

LET'S LEAVE THE HAZE OF ACCOUNTING theory for a look at the kinds of features accounting programs provide. Along the way, I'll show how an accounting program ties together the various aspects of a business's financial life. You'll also get a feel for the amount of setup work required to get an accounting package up and running. To see which features the current crop of programs provide, see the features table in "Balancing the Books," in this issue.

▪ **GENERAL LEDGER (G/L)** The heart of every manual or computer-based accounting system, the general ledger is a detailed record of transactions, organized according to account. When you start out with an accounting program, you set up a *chart of accounts*, a database that lists each account (telephone, equipment loan, petty cash, payroll, checking, and so on), its type (asset, equity, expense, and so on), and its starting balance. When you make an entry in the general ledger, you choose the account the entry pertains to from the chart of accounts—no retyping is required. As you work in other parts of the program, the general ledger is updated accordingly.

▪ **ACCOUNTS PAYABLE (A/P)** This portion of an accounting program pays the bills. You can write individual checks for one-time purchases and also set up *recurring transactions* for regular bills such as monthly rent and loan payments. When setting up the accounting program, you enter a list of all the vendors you purchase from, including their addresses, credit terms, and your preferred shipping method. All programs can print checks on preprinted check stock; most programs include catalogs for checks and other forms. Some programs can also generate purchase orders: just specify the vendor and what you want to order, and the program prints a P.O.—and also posts its total to your general ledger and accounts-payable ledger.

▪ **ACCOUNTS RECEIVABLE (A/R)** The opposite of accounts payable, the accounts-receivable ledger handles incoming money. In most programs, you can enter income items directly into the accounts-receivable ledger window, or you can create and print invoices and tell the program to post their totals to the A/R ledger. When the program posts the invoice, it also makes entries in other relevant journals, recording, for example, sales tax payable and outbound freight costs in the A/P journal. All the while, the program is following the rule of double-entry accounting, making a corresponding debit every time it makes a credit, and vice versa.

▪ **INVENTORY** For many businesses, buying and selling also involves tracking inventory—how many items you have in stock, how many you've sold, the stock

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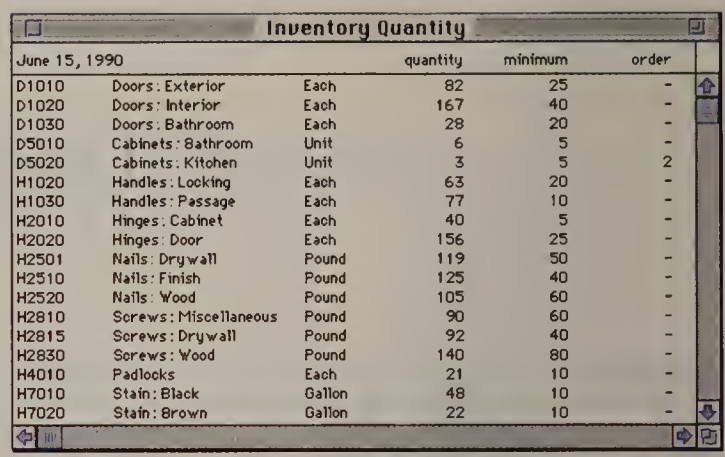
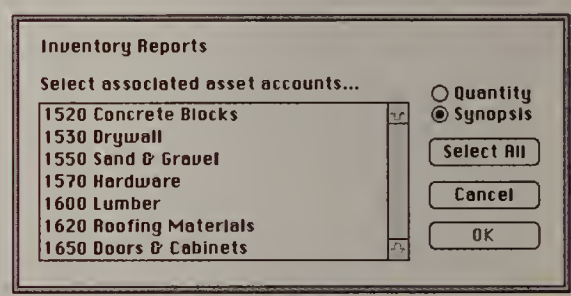
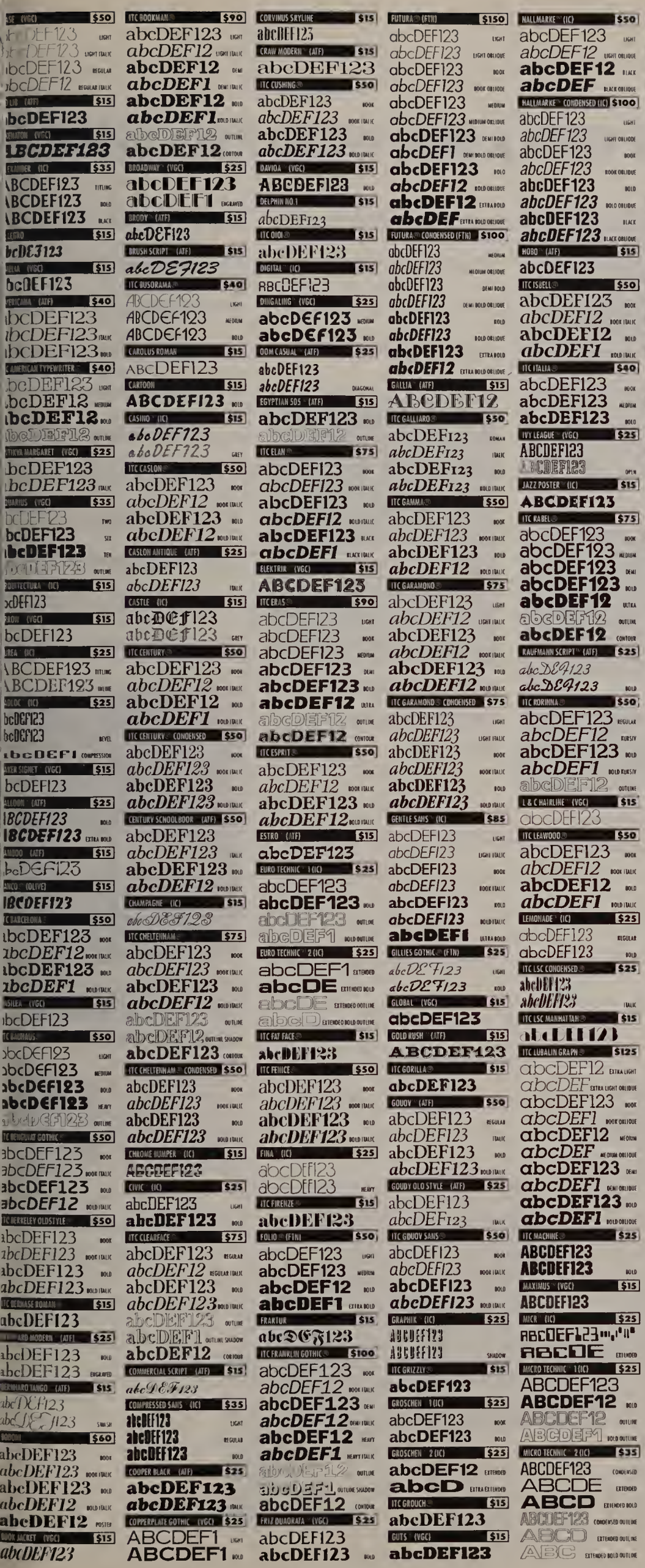


Accounting for Inventory Programs that provide inventory-management features (such as Computer Associates' ACCPAC Simply Accounting, shown here) let you view reports that analyze your stock. You select which inventory accounts are to be shown (bottom), and view the resulting report (top).





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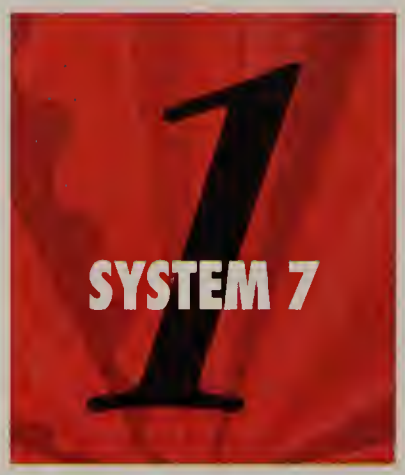


Because you're ready to see what System 7 can do.

Apple calls System 7 the biggest improvement in Macintosh since Macintosh. And WordPerfect® is now System 7 savvy.

So now (among lots of other new things), WordPerfect will automatically keep track of changes that you (or someone else) might make to imported files (charts, graphics, whatever), and update your WP documents accordingly. Now, a change made in one place can be a change made in many places. Apple calls it "Publish and Subscribe," and it works between programs on your hard drive, as well as among people on your network. Publish and Subscribe assures you that your documents will always reflect the latest information available.

And it's just one of the new System 7 tricks that WordPerfect 2.1 has mastered.

Because WordPerfect does columns better than the Greeks.

Pick a starting point, click on the ruler, and see your text in two columns. Or in three columns. Or five columns. With vertical rules beside or between them, if you like. Drag a guide on the ruler and try *unequal* columns. Highlight text in a box that jumps across columns.

Go crazy with the design, or stick with the tried-and-true. The point is, WordPerfect gives you formatting options that other word processors don't. And exploring them couldn't be much easier.

Because you'd use more graphics if using them were easy.

WordPerfect not only gives you full control over the placement of graphics in your text, it also gives you a color drawing program for modifying imported artwork (or starting over from scratch) without ever leaving the program.

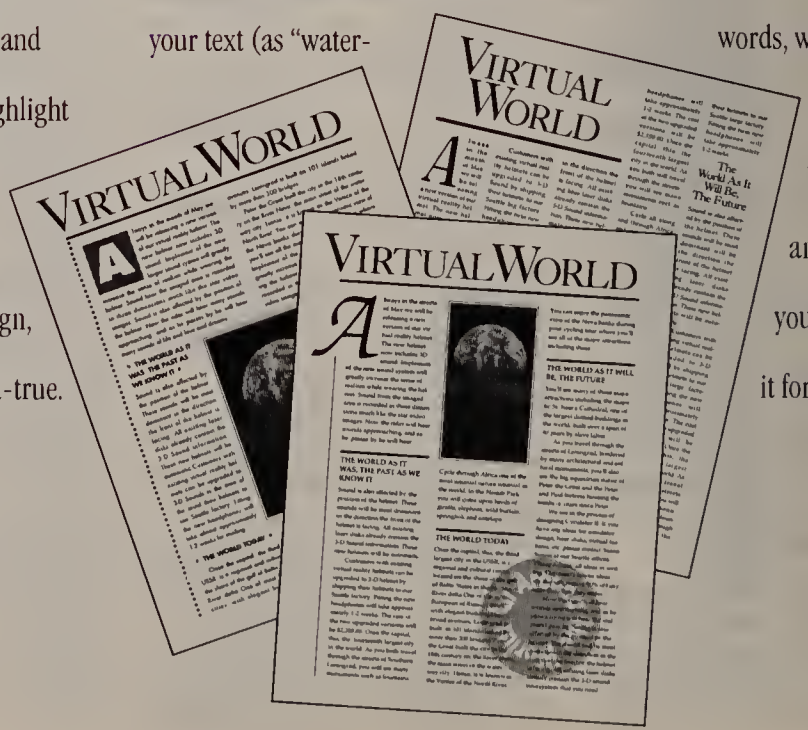
You can print graphics under your text (as "watermarks") or on top (as overlays).

You can use the drawing tools t rotate text to any angle that strikes your fancy (something many page layout programs still can't do).

And WordPerfect gives you 36 border styles and 64 fill patterns — which you can use in any of 256 colors — for highlighting graphics, paragraphs, columns, pages, even blocks of text.

Because a movie is worth who-knows-how-many words.

If a picture is worth a thousand words, what's a movie worth? With WordPerfect and QuickTime you can calculat it for yourself.



MACINTOSH 7 SYSTEM SYSTEM 7 SAVVY

Apple's QuickTime is a new technology that lets you work with digital video and sound as easily as you now work with text and graphics files.

Imagine being able to place (and size) a QuickTime movie anywhere in a document. You could add urgency to a memo with a few well-chosen words delivered "live." Or help an audience visualize your latest brainstorm with a 3-D simulation they can start, stop and replay.

We have a feeling that words can't begin to describe all the ways you'll think of to use it.

Because you get tired of repeating yourself, yourself, yourself.

Perhaps because they've heard it's a powerful programming language, WordPerfect's macro editor intimidates some people at first. It shouldn't.

It's no more complicated than a tape recorder. Click "record" and it memorizes your keystrokes. Click "play" and it repeats them.

With no more knowledge than that, you can create a WordPerfect macro. And can spare yourself the effort of formatting M-E-M-O-R-A-N-D-U-M, T-o-:, F-r-o-m: (and so on) across the top of the page every time you want to fire off a memo, for example.

But simple as recording your own macros can be, we also ship a number of them with the program. For formatting addresses to print on envelopes. Placing "drop caps" at the start of paragraphs. And other jobs you'd rather not do twice.

Because some people work on DOS computers.

You want the word processor that's right for you. If your choice happens also to be the choice of millions of others — with other computers — so much the better.

That's why WordPerfect is such a good choice. Lots of DOS users use WordPerfect. As well as UNIX, VMS and other users. If you ever find your Mac on a network with other computers, WordPerfect's compatibility can save you a lot of aggravation. Not to mention a lot of reformatting.

Because even if you never call us, it's nice to know we're here.

Like any good Mac program, WordPerfect 2.1 is easy to use. But unlike many Mac programs, you're not on your own with it. You get toll-free help from one of the largest support staffs in the industry.

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quantity at which you reorder, and so on. It makes sense, then, that many accounting packages also provide inventory-management features. When you set up the accounting program, you create a list of all the products you sell, along with pricing information and the quantity currently in stock (see "Accounting for Inventory"). When you use the program's accounts-receivable section to generate an invoice, you simply select the items from an inventory window—there's no need to type the item name or remember its stock code. When you post the invoice, the accounting program automatically adjusts your inventory records accordingly and informs you when your stock of a particular item is low.

• **PAYROLL** Employee wages also affect a business's bottom line, so it follows that many accounting packages provide payroll-management features. During setup, you enter the name and address of each employee, as well as wage information and deduction data for taxes, savings plans, insurance, and the like. At each pay period, the program prints payroll checks and updates the general ledger. Programs that handle payroll are often updated annually to reflect the latest tax laws. In many programs, you can also associate some or all of an employee's wages with a particular project. You can then create reports that show how much you've spent and earned on each project.

• **REPORTING** Accounting programs go beyond automating addition and subtraction by allowing you to view and print reports that summarize and let you analyze financial data. Every module of a program has a corresponding array of reports. You can print financial statements such as balance sheets and earning reports. You can print employee tax documents such as W-2 forms and year-to-date earnings summaries. You can print *aging* reports that categorize accounts receivable according to date—find out which customers pay within 30, 60, or 90 days. (Some accounting programs can also print collection letters for late accounts.) You can print inventory reports to show which items you should reorder, which are backordered, and much more. Many programs can also put their reports in graphical form, creating graphs and pie charts that summarize tables of numbers (see "Graphic Accounting").

Integrated or Modular?

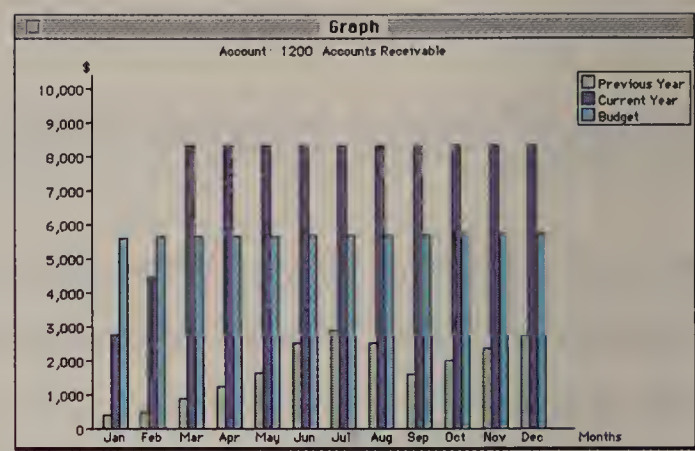
YOU THINK YOU ARE READY TO TAKE the plunge—but how do you pick a program? Start by deciding between an *integrated* package and a *modular* one. Most small-business accounting programs are of the integrated variety—they include most or all of the aforementioned features. A few examples of integrated accounting programs include Softsync's Accountant, Inc.; Computer Associates' ACCPAC Simply Accounting; Peachtree's Peachtree Accounting for Macintosh (formerly atOnce); and Teleware's M.Y.O.B.

Modular programs are like Macs with expansion slots—they accept add-ons that provide new features. One example is SBT Corporation's Series Six Plus. It includes G/L, A/R, and A/P modules, but can be expanded to handle payroll, time billing, job costing, property management, and more. When you're shopping for a modular program, evaluate not only the features it includes, but also the ones you can add later.

Some modular programs have actually been written using high-end database managers such as Blyth Software's Omnis 5 or Microsoft's FoxBase+/Mac. The advantage of such an approach is that a consultant or programmer who is experienced in one of these database programs can customize the accounting package to handle unique accounting or reporting needs. The drawback is that such programs are often more complex and a bit harder to use. Integrated accounting programs generally take better advantage of the Macintosh's interface, providing tool palettes and icons that correspond to common accounting functions.

If you want several people on a network to be able to access your accounting system simultaneously, you'll want a package that supports *multiuser* access. Some integrated packages are available in multiuser versions, but most multiuser programs are of the modular variety.

If you operate a retail business, check out the unique offerings from ShopKeeper Publishing. ShopKeeper Plus is an electronic cash-register program that also handles inventory and order entry—a combination accounting program and retail-sales system. Used with the firm's Classic POS system, ShopKeeper really is a cash register: Classic POS includes a heavy-duty metal cash drawer and receipt printer; a bar-code scanner is optional. Add a Macintosh Classic or Classic II, and you're ready to ring up sales. The ShopKeeper Plus software can also talk to Shop Keeper's QuickShip, a program that automates the process of preparing shipping manifests for United Parcel Service. It can calculate shipping costs based on UPS zones and delivery options, and can print labels for cash-on-delivery packages.



Graphic Accounting Built-in graphing features let you spot trends and quickly compare this year's results with last year's. Shown here: an accounts-receivable graph created by In-House Software's In-House Accountant.

Ease-of-use issues and feature lists are important, but what counts most is how well a given package fits your business. If you're an attorney, inventory features won't mean much to you. If you have a bookstore, why pay for time-billing features? Narrow the field to the products whose features best mesh with your business. Then, you may want to talk with your accountant or a consultant to settle on a specific program. If your accountant or tax preparer is familiar with a given program, that may influence your choice. You'll be able to simplify life in early April by supplying a disk instead of a duffel bag full of paperwork.

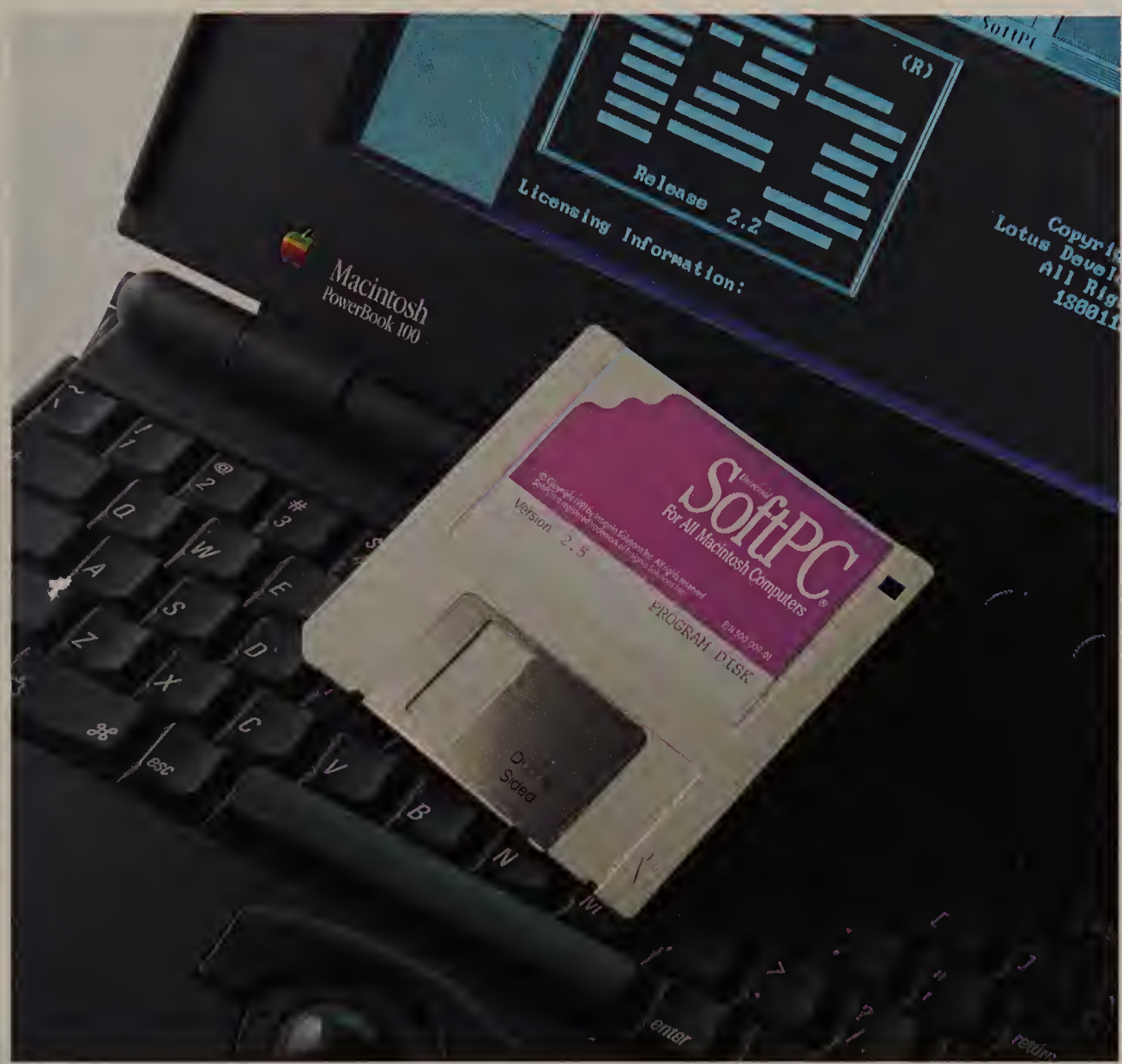
If you're an accounting neophyte, you may also want to consult an accountant when setting up your program. He or she can advise you on the best ways to set up your chart of accounts, payroll deductions, and other details. After you've set up the program, you may want to use it in parallel with your current accounting system for a brief time to avoid being shut down by unforeseen wrinkles.

Getting an accounting program up and running means more than copying it to your hard drive. But then, no other category of software so directly affects your business. And only tax-preparation software has the same ability to get you in trouble with the government. Accounting software isn't for the impatient or the disorganized. It requires careful planning and diligent upkeep (not to mention a religiously followed backup routine). But in return, it gives you error-free math, less tedium, and hopefully, more time to do what you're really in business for. **m**

See *Where to Buy* for contact information.

Contributing editor JIM HEID looks at a different aspect of Mac fundamentals each month. His latest books are *Macworld Guide to Microsoft Word 5* (1992) and *Macworld Complete Mac Handbook* (1991), both published by IDG Books Worldwide.

Why Your Next IBM Computer Should Be A Macintosh.



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Insights

BY TOM NEGRINO

Tips and Techniques for Power Publishers

With an assist from the Apple LaserWriter, Aldus PageMaker begat desktop publishing in 1986. Since then, thousands of graphic arts professionals, corporate communicators, and just plain folks have made PageMaker their page-layout tool of choice. But Aldus has faced stiff competition in cornering the market of desktop publishers, most notably from QuarkXPress. Aldus's latest response to this challenge is PageMaker 4.2, which adds a number of improvements, including a scripting language, support for Apple events, and the introduction of Aldus Additions—plug-in modules that give PageMaker additional features. For more information on PageMaker, call Aldus at 206/628-2320; fax 206/343-3360.

Special thanks—for their tips, tricks, and patience—go to Jo Ann Villalobos, *Macworld*'s senior production editor; Olav Martin Kvern, who with *Macworld* contributing editor Steve Roth, is the author of the excellent and recommended *Real World PageMaker 4 Industrial Strength Techniques* (Bantam Books, 1990); and the team at Aldus technical support.

Take Control with Scripts

The PageMaker scripting language is very powerful. Normally you run a script by choosing Run Script (under Aldus Additions in the Options menu). See "Aligning Objects Using Scripting" for an example of a script in action. However, you can run scripts faster by using System 7 and CE Software's QuicKeys. QuicKeys 2.1.2 can send and receive System 7 Apple events (provided you're running CE Software's CEIAC application, included with QuicKeys) and can use Apple events to communicate with PageMaker. Suppose you wanted to create a QuicKey to switch between measurement systems. It's almost impossible to create the right sequence of clicks and drags to get QuicKeys to do this from the pop-up menus in PageMaker's Preferences dialog box accessed from the Edit menu. Here, in ten steps, is how to get QuicKeys to send PageMaker a script to switch measurement systems.

1. Invoke QuicKeys while PageMaker is open.
2. Choose Apple Events from the Extensions submenu in the Define menu. (If you don't see this extension, you have to locate it on your QuicKeys disks and install it.)
3. In the Apple Events Extension dialog box, choose PageMaker 4.2 from the Send Event To pop-up menu.
4. Choose Custom Event from the Event pop-up menu. QuicKeys adds a new, empty Apple event list to the dialog box, just below the Event pop-up menu.
5. Click on the New button. QuicKeys displays the Parameter Number 1 dialog box, where you can enter the specific information you want to send to PageMaker, and the Apple events QuicKeys will use to send it.
6. Enter a description in the Description text-edit box. Enter ---- (four hyphens) in the Keyword text-edit box. Choose Text from the Parameter Type pop-up menu (QuicKeys will enter TEXT in the Parameter Type text-edit box).
7. Type in measureunits inches,inches; (be sure to put the comma and semicolon in this programming statement) in the Data text-edit box to tell PageMaker to change the

continues

Aligning Objects Using Scripting

People have been asking for a simple object-alignment feature in PageMaker since the program first appeared. While Aldus still hasn't put that feature in PageMaker, you can do a fair amount of alignment using scripting. Here's a script to align the tops of two objects. The lines that begin with two hyphens (--) are comments. PageMaker will ignore everything from the hyphens to the next carriage return.

```
--align tops script¶
redraw off¶
--get rid of the guides on the page¶
deleterulerguides¶
--put a guide at the top of the last object in the drawing order¶
guidehoriz last top¶
--select the first object in the drawing order¶
select 1¶
--move the selected object to the guide we positioned earlier¶
move top guide 1¶
--turn redraw back on again¶
redraw on¶
--end script¶
```

Type this script into PageMaker's text editor, export it as a text-only file, and name it "Align Tops." Select the object you want to move and press ⌘-B to send it to the back (this makes it first in the drawing order). Then select the object you want to align to, and press ⌘-F to bring it to the front. This makes it the last object in the drawing order. Now run your script. If you've typed everything correctly, PageMaker moves the top of the first object so that it's aligned with the top of the second object.

units of measurement used in both the vertical and horizontal rulers to inches. If you wanted to change both of the rulers to picas, you'd type measureunits picas,picas;. If you wanted to change the horizontal ruler to picas, and set the vertical ruler to 16-point increments, you'd type: measureunits picas, custom,16.

8. Click on OK to close the dialog box.

9. Back in the Apple Events Extension dialog box, choose Wait from the Return Value pop-up menu. In the Class text-edit box, enter misc and in the ID text-edit box, enter dosc. Assign a key to your macro, and close the dialog box.

10. Close QuicKeys, take a deep breath, and in PageMaker, press the key you've assigned. If your current measurement system is different from the one you've specified in the Apple Events QuicKey, you'll see the tick marks in the rulers change to the new units of measurement. Now that you've learned how to send Apple events to PageMaker from QuicKeys, you can put just about any script you want done under a key—it's a lot faster than using Run Script.

.....

A Style All Your Own

It's easy to create a style from formatted text. First, set a few words using the type specs that you want. Highlight the text, hold down the ⌘ key, and click on the No Style choice from the Styles palette. This will call up the Edit Style dialog box, with the type specs of those highlighted words already entered. All you have to do is give your style a name, then click on OK.

When applying a style to a paragraph, avoid overwriting any manual specifications you've added by holding down the shift key when selecting the style from the Styles palette. This will apply general specs from the newly applied style, but will not overwrite any special fonts, rules, or point sizes. This is especially useful when you're using special characters from another font in the paragraph, such as the ⌘ key symbol, which is found in the Chicago font.

.....

Getting the Right View

For convenience in traveling through your document, hold down the ⌘ and option keys, then use the mouse to pull down and select the view you want (such as Actual Size) from the Page menu. Voilà! Each page you turn to appears in the view you chose from the menu.

To see a page at Fit in Window view, hold down the shift key as you click on the page icon at the bottom left-hand corner of the screen.

To get an overview of your document, here's how to produce an on-screen slide show of the document's pages. Set each page to the Fit in Window view (see above). Then, hold down the shift and option keys, while choosing Go to Page from the Page menu. PageMaker shuffles through the document repeatedly, starting at the first page and pausing for a moment at each page or spread. Clicking the mouse stops the show on the current page.

.....

Don't Do It the Slow Way

You don't have to wait until PageMaker redraws the screen before you press on with your work. For example, here is a fast way to change paragraph leading. First, select a paragraph. Now, without pausing when the screen redraws, type ⌘-T (Type Specifications), press the tab key to move to the Leading field, key in a value, then hit the return key. This beats pulling down the Type menu, especially if you want a point value other than those values in the PageMaker menu; and the screen redraws much faster once you've made your change.

Here's another time-saving tip. Select an object with the arrow tool; use a combination of the ⌘ key and an arrow key to nudge the object 5 pixels at a time in the direction of the arrow key. Holding down the arrow key repeats the nudge quickly, and lets you move objects into place with precision.

Avoid using the Type Specs menu to specify reverse type. Instead you can use the pull-down Type Style menu; but the quickest method is to use the Colors palette (⌘-K). With the type selected, choose Paper as your color. To verify that this is indeed the same as Reverse type, notice the color choice (Paper) as well as the type style (Reverse) when you open the Type Specs menu (⌘-T).

.....

Borrowed Characters

Way back when PostScript printers first came out (like the original LaserWriter), a lot of the typefaces—Times and Helvetica, for instance—were missing some characters, like ™ and ©. So PageMaker was set up to borrow those characters from the Symbol font. However, newer fonts include these characters, so substituting the generic Symbol characters can create problems, because you may get different results on the printer from what you see on screen. To tell PageMaker that you are using fonts with special characters included, turn off the Use Symbol Font for Special Characters check box in the PostScript dialog box, accessible from the Print dialog box. If you've got old fonts and the special characters don't appear on a printout, try turning this option on.

.....

Easier Indexes

If you want to enter every occurrence of a particular text string into your index, first open the Story editor (⌘-E). Then press ⌘-9 to display the Change dialog box. Type the string in the Find What text-edit box. Press tab and type ^ in the Change To text-edit box. Select the range of text you want to index, and then click on the Change All button. PageMaker finds every occurrence of the text you entered in the Find What field and enters it as a first-level index entry.

If you want to index several occurrences of a name containing a middle name or middle initial, type a nonbreaking space (by typing option-spacebar) between the first name and the middle name as you enter the name in your story (or, if you've already entered the name with a normal space, search for the name and insert a nonbreaking space). Enter a nonbreaking space (^s) as you type the name in the Find What text-edit box, then follow the rest of the index sequence above.

To remove all of the index entries in your publication (including index entries in the other publications in the current book list), hold down ⌘-option-shift and click on the Remove button in the Show Index dialog box. Think about this before you do it. Do you really want to delete all the index entries in your publication? To remove all the cross-references, hold down ⌘-option and click on the Remove button. To delete all the cross-references you've entered since you opened the dialog box (or pressed Accept), hold down the option key and click on the Add X-Ref button. OK, so you deleted index entries or cross-references in your publication and now you want them back. If you haven't closed the Show Index dialog box yet, you can hold down the option key and click on the Remove button, or click on Cancel. Otherwise, you're left with the Revert command in the File menu.

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Sharing the Wealth

If you've got a PageMaker tip that's made your life a bit easier, share it with other *Macworld* readers by sending it to *Quick Tips*, *Macworld*, 501 Second Street, San Francisco, CA 94107. **m**

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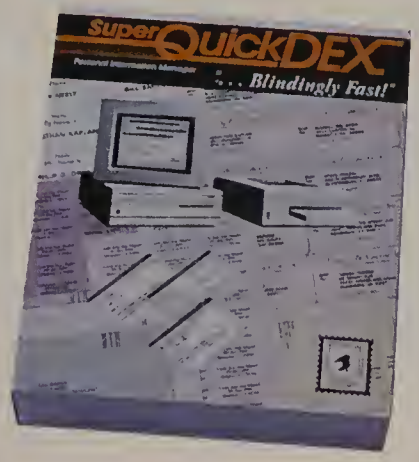

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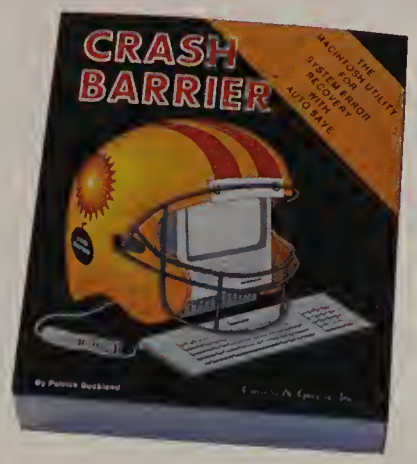

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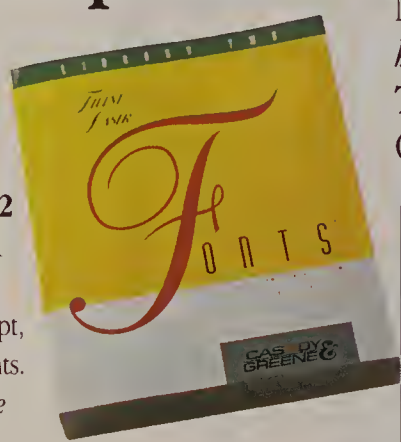

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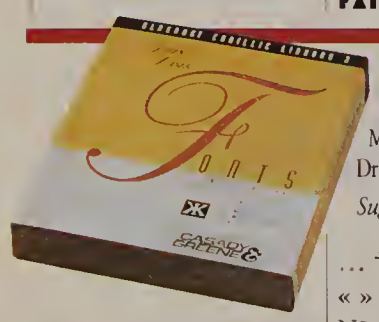

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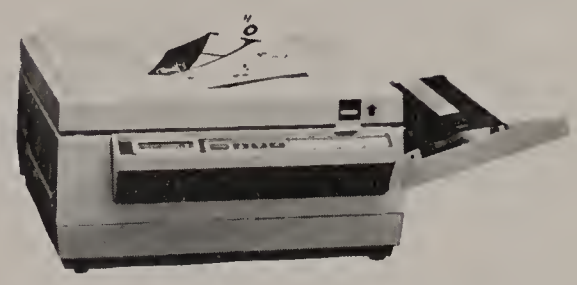

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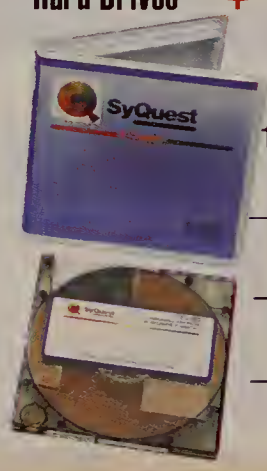

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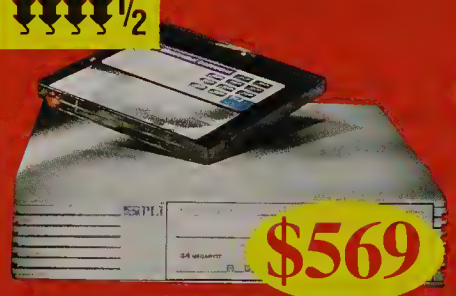

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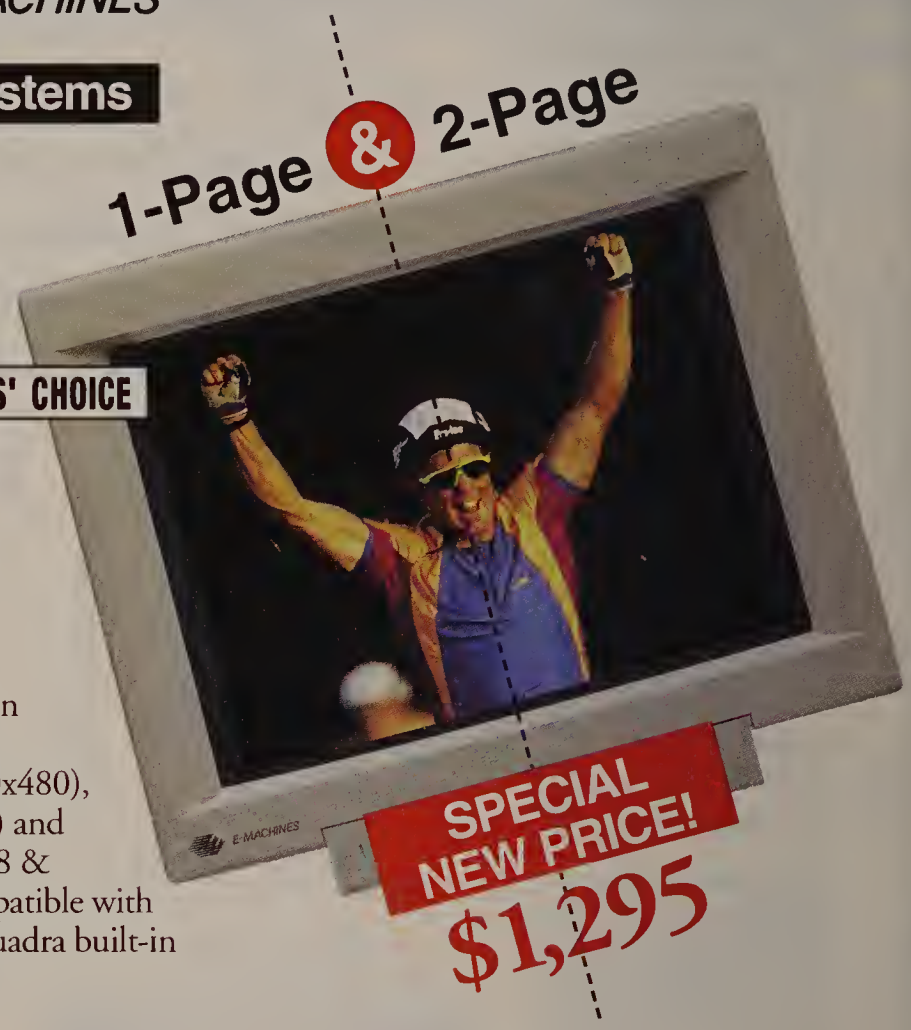

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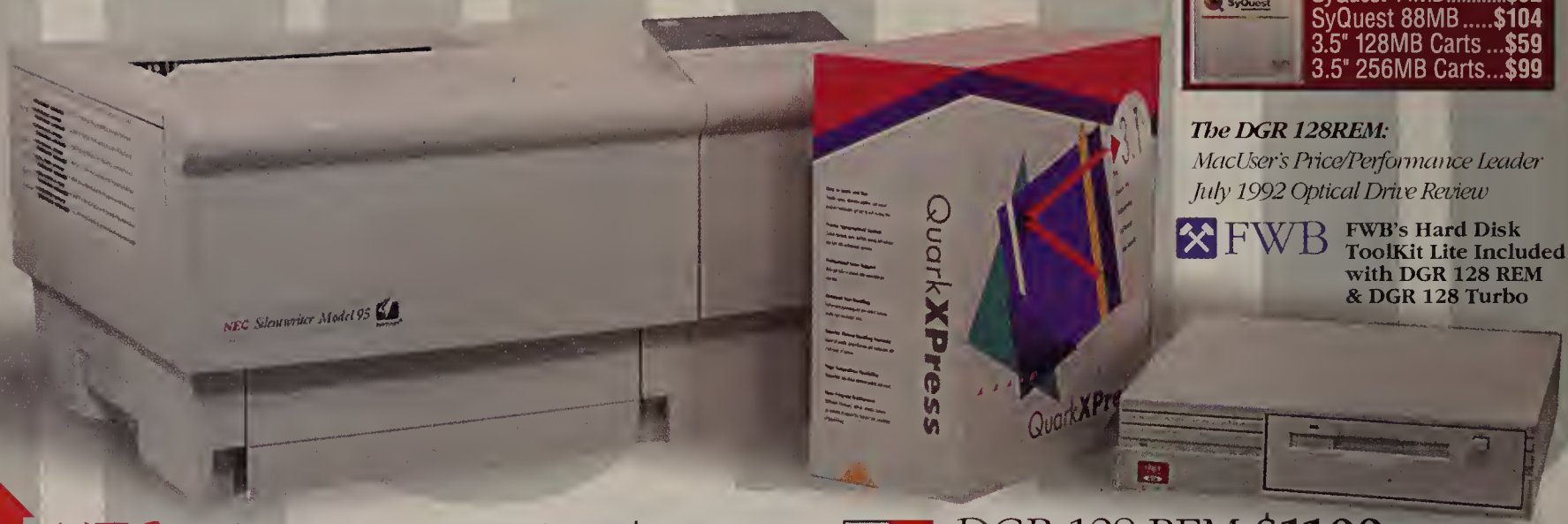

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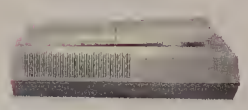

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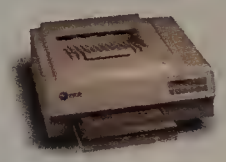

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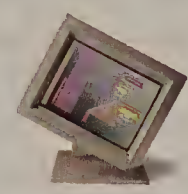

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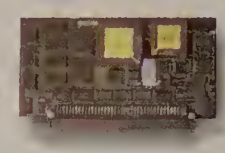

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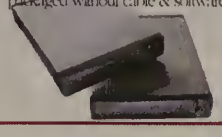

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SyQuest Drives feature: Industry standard half-height 5.25" form factor • 20 ms average seek time • Fully embedded SCSI controller • MTBF of 60,000 hours • SyQuest Drives include a **TWO YEAR Warranty, one cartridge & necessary cables, SCSI Director™ v.2.4 Formatting Utility** * Includes (1) 44mb & (1) 88mb cartridge • SyQuest Cartridges carry a ONE YEAR Warranty

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52mb	LPS50	3.5" Low Profile	9ms	49mb	$215	$275
80mb	Go-Drive	2.5" Low Profile	9ms	80mb	$419	$519
85mb	ELS85	3.5" Low Profile	17ms	82mb	$275	$335
105mb	LPS105	3.5" Low Profile	9ms	100mb	$335	$395
120mb	LPS120	3.5" Low Profile	10ms	116mb	$409	$469
120mb	Go-Drive	2.5" Low Profile	9ms	120mb	$529	$629
127mb	ELS127	3.5" Low Profile	19ms	124mb	$339	$399
170mb	ELS170	3.5" Low Profile	19ms	160mb	$429	$489
240mb	LPS240	3.5" Low Profile	10ms	234mb	$649	$709
425mb	PRO425	3.5" Half Height	8ms	406mb	$899	$959

ELS drives have 32K cache, low power consumption, MTBF of 250,000 hrs and TWO Year Warranty. **LPS** drives have 64K - 256K cache, MTBF of 250,000 hrs, and TWO Year Warranty. **PRO** drives have 256K cache, MTBF of 150,000 hrs, and TWO Year Warranty. **Go•Drives** have 32K cache, low power consumption, MTBF of 150,000 hrs, and ONE Year Warranty.

5 YEAR WARRANTY FUJITSU

Unbeatable Quality and Performance

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425mb	M2623SA	3.5" Half Height	9ms	405mb	$969	$1029
520mb	M2624SA	3.5" Half Height	9ms	496mb	$1189	$1249
645mb	M2263	5.25" Full Height	16ms	640mb	$1259	$1359
1.2GIG	M2266	5.25" Full Height	14.5ms	1029mb	$1729	$1829
2.0GIG	M2652SA	5.25" Full Height	11ms	1665mb	$2899	$2999

Fujitsu 3.5" high performance SCSI disk drives features:
• 10MB/s data transfer rate • 6.82 ms average latency • 240 KB read-ahead cache buffer

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Seagate

Unformatted Capacity	Model	Product Description		Actual MAC Capacity	Internal	External
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420mb	ST1480N	3.5" Half Height	14ms	406mb	$1059	$1119
525mb	ST1581N	3.5" Half Height	14ms	500mb	$1198	$1258
1.2GIG	ST11200N	3.5" Half Height	10.5ms	1000mb	$2119	$2179
320mb	ST4385N	5.25" Full Ht W-R	10.7ms	315mb	$1249	$1349
645mb	ST4766N	5.25" Full Ht W-6	15.5ms	632mb	$1285	$1385
645mb	ST4767N	5.25" Full Ht W-R II	11.9ms	634mb	$1549	$1649
1.2GIG	ST41200N	5.25" Full Ht W-7	15ms	989mb	$1729	$1829
1.6GIG	ST41651N	5.25" Full Ht W-8	15ms	1350mb	$2099	$2199
2.1GIG	ST42100N	5.25" Full Ht W-9	12.9	1900mb	$2949	$3049
1.6GIG	ST41600N	5.25" Full Ht **Elite-1**	11.5ms	1307mb	$2399	$2499
2.4GIG	ST42400N	5.25" Full Ht **Elite-2**	11ms	2050mb	$3299	$3399
3.4GIG	ST43400N	5.25" Full Ht **Elite-3**	11ms	2750mb	$4999	$5099

Seagate Drives include a ONE Year Warranty.

Maxtor®

Unformatted Capacity	Model	Product Description		Actual MAC Capacity	Internal	External
120mb	7120XT	3.5" Low Profile	15ms	121mb	$349	$409
207mb	7213	3.5" Low Profile	15ms	202mb	$Call	$Call
330mb	LXT-340	3.5" Half Height	15ms	324mb	$839	$899
535mb	LXT-535	3.5" Low Profile	12ms	510mb	$1219	$1279
645mb	XT-8760S	5.25" Full Height	16.5ms	639mb	$1349*	$1449
1.2GIG	PO-12S	5.25" Full Height	13ms	997mb	$1729*	$1829
1.7GIG	PO-17S	5.25" Full Height	13ms	1433mb	$2199*	$2299

Maxtor 3.5" Disk Drives include a ONE Year Warranty. Maxtor 5.25" Disk Drives include a TWO Year Warranty. * Internal Full Height Drives fit the Mac II, IIx, IIfx, and Quadra 900 only.

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2.0GIG	WangDAT 1300XL	DAT, DDS	4mm	10-15 MB/s	$1329
3-5GIG	WangDAT 3200	DAT, DDS-DC	4mm	10-15 MB/s	$1549
2.0GIG	HP 35470A	DAT, DDS	4mm	10-15 MB/s	$1389
3-5GIG	HP 35480A	DAT, DDS-DC	4mm	10-15 MB/s	$1819
2.2GIG	Exabyte EXB-8200	Digital/Helical	8mm	10-15 MB/s	$1949
5.0GIG	Exabyte EXB-8500	Digital/Helical	8mm	10-15 MB/s	$3229

Includes RetroSpect v.1.3c Backup Software & One Tape
and ONE Year Warranty

Call for more information ClubMac Optical Drives

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CMO-LF3004	Panasonic	128mb	3.5" Half Ht	45ms	$1185
CMO-3100E	Ricoh	128mb	3.5" Half Ht	45ms	$1249
CMO-3600	Ricoh	594/652mb	5.25" Full Ht	28ms	$2695
CMO-5030E2	Ricoh	594/652mb	5.25" Full Ht	66.7ms	$2149
128mb Cartridge		3.5" Single Sided			$39
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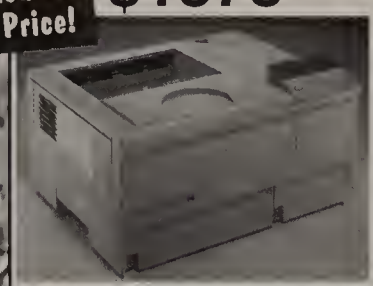

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Macintosh Memory	
1mb X 8- 80ns	$28
2mb x 8 - 80ns	$64
4mb X 8 - 80ns	$99
16mb X 8 - 80ns	$479

Mac IIfx	
1mb X 8 - 80ns	$30
4mb X 8 - 80ns	$122
16mb X 8 - 80ns	$549
Video (Q700/900)	
256K VRAM	$29

Modems • Modems • Modems

SupraFAXmodem $359
14,400 Baud FAX/MODEM V.32bis, V.42bis w/ microphone and faxSTF & cables

VIVA Fax Modem $359
14,400 Baud, FAX/MODEM, V.32bis, V.42bis w/ Quicklink II & cables

Telebit Worldblazer (T-3000) $669
14,400 Baud, 19,200 Baud using PEP, V.32bis, V.42bis

PSI		Global Village (for PowerBooks)	
ComStation1(24/96/48 S/R fax modem)	$159	PowerPort Bronze(24/96 S/R fax modem)	$215
~~ComStation5(14,400 S/R fax modem)~~	~~$515~~	~~PowerPort Silver(96/96 S/R fax modem)~~	~~$435~~
PowerModem(24/96/48 S/R fax modem)	$199	PowerPort Gold(14,400 S/R fax modem)	$595
PowerModem 10-42 (24/96 S/R fax modem V.42bis, MNP 10)			$249

radius™

Radius Interface Cards/Multimedia	
VideoVision	$2009
PrecisionColor 8 Interface	$499
PrecisionColor 8X Interface	$729
PrecisionColor 8XJ Interface	$495
PrecisionColor 24X Interface	$1629
PrecisionColor 24XP Interface	$495
PrecisionColor 24XK Interface	$829
Color Pivot Interface	$505
Two Page Display Interface	$395
PowerView	$499
Radius Displays	
Color Display/21	$1945
PrecisionColor DIsplay/20	$2759
PrecisionColor Display/19	$2089
Color Pivot	$1289
Color Pivot/LE	$Call
Full Page DIsplay	$579
Two Page Display/19	$899
Two Page Display/21	$1159
Accelerators	
Radius Rocket 25i	$1239
Radius Rocket	$1649
Radius Rocket 33	$2069

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Graphic Displays	
SuperMatch 20" Dual Mode Trinitron	$2499
SuperMatch 17" Multimode Color	$1089
21" Platinum (Black and White)	$999
Digital Video Boards / Acceleration	
Video Spigot (NuBus or IIsi / LC)	$499 / 419
Spigot and Sound (NuBus)	$755
VideoSpigot Pro (NuBus or IIsi)	$1345
ThunderStorm	$Call
Graphic Cards	
Spectrum/24 Series III	$1175
Spectrum/24	$755
Spectrum/24 Accelerator	$419
Spectrum/8•24 PDQ	$829

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Seeking Macintosh information, and lots of it? Look no further than MACWORLD Expo/San Francisco 1993. MACWORLD Expo has it all; there's amazing exhibits, brand new products and Macintosh excitement. And if you're seeking concentrated, in-depth information on a variety of subjects, look no further than the MACWORLD Expo Conference Program.

Creative Vision In A Changing World

MACWORLD Expo/San Francisco 1993

The Conference Program at MACWORLD Expo/San Francisco 1993. TWELVE Conferences in One!

The MACWORLD Expo/San Francisco 1993 Conference Program offers more insight and expertise than ever before. To get your Macintosh "drive" up and running in the morning, the Keynote Address by Apple Computer and friends is an absolute must. Plan to attend up to 12 intensive conferences whose topics reflect the growing sophistication of Macintosh users. With MACWORLD Expo's one-price conference admission, you can create your own agenda. Spend as much time as you'd like at any or all of these conference seminars:

1. **The Design Conference.** Pushing the desktop envelope. Electronic prepress expertise. Professional color input/output. 3-D modeling and rendering. Interactive publishing.

2. **The Enterprise Computing Conference.** Tools and technologies available (and on the horizon) to address development issues facing IS departments, including client/server, cross-platform, GUI, object-oriented design, and more.

3. **The Programmer/Developer Conference.** For in-house developers, veteran independents, and novice Mac techies alike: the latest on IAC, AppleEvents, OCE; database engine technology; XTND; transitions from mainframes to Macs; and more.

4. **The How-to-Get-Started Conference.** Complete guidelines for those who are brand-new to the Mac, or need a concentrated lesson on popular Mac applications.

5. **The Advanced User Conference.** Experienced users share their expertise for getting more mileage out of the PowerBook, desktop publishing, and System 7's power user features.

6. **The Connectivity Conference.** Users and vendors share insights on flourishing in a multi-platform environment, cross-platform databases, understanding client/server technology, Mac/PC integration on a LAN, Macs and UNIX workstations battling for your desktop.

7. **The Science/Technology Conference.** Stellar applications of the Macintosh in laboratory and scientific settings, plus user feedback and industry updates on the Mac's role as a computing platform in these areas.

8. **The Home Office/Small Business Conference.** Reduce the chaos and maximize your efforts in a Mac home/small business. Look at hardware/software designed to save you time and money, and seek disaster-avoidance strategies.

9. **The Entertainment Conference.** Bridging the gap between Hollywood and Silicon Valley with desktop video, digital audio, broadcast-quality graphics, animation, virtual reality, MIDI, and digital video effects.

10. **The Special Interest Group Conference.** Compare Mac notes with others in a similar setting — and develop an invaluable "user network ." Here you will find sessions on the Mac in law, health care and real estate.

11. **The Multimedia Conference.** Maximum power multimedia for maximum payback. Low-end multimedia magic on a shoestring. Emerging technology watch. Multimedia in entertainment, advertising, and corporate settings.

12. **The Education Conference.** Fourteen education-specific sessions make this the world's largest and most information-rich collection of Macintosh topics designed especially for educators! An excellent opportunity for educators, administrators, and students nationwide to show and be shown new and classic examples of the Mac as a teaching tool — including multimedia, CD-ROM, HyperCard, networking, QuickTime for teachers, the Mac in math and science, and much, much more.

And don't miss the UGWUMP (User Group Welcoming/Unwinding/Meeting Place)

— MACWORLD Expo's "People Networking Parlor" for user groups. Share success stories, exchange newsletters and literature. Learn how to start a user group in your area!

Kaleidoscope of Savings For MACWORLD Expo/San Francisco 1993

Save $15 on Exhibits and Conferences or $10 on Exhibits Only
Admission for MACWORLD Expo/San Francisco 1993: Preregister by December 1!

We're pleased to offer a complete package of savings, discounts and convenience to make your MACWORLD Expo/San Francisco experience even more enjoyable. Whether you're flying, driving, or staying overnight, we have you covered! Let's start by getting you to San Francisco—

AA. Save Up To 38% on American Airlines!

You'll receive substantial savings when you fly American Airlines to MACWORLD Expo/San Francisco. As the official airline of MACWORLD Expo, American is again pleased to offer discounts of up to 38% on your fare. Dial 1-800-433-1790 and ask for Star File #S-0113AL. You'll automatically receive the preferred rates.

Hertz Discounts

If you're planning to rent a car, you'll get a great rate from Hertz. Call 1-800-654-2240, ask for Meeting #2285, and be sure to tell the reservations operator you're attending the best Macintosh show, MACWORLD Expo.

Preregistration Savings

Preregister for MACWORLD Expo/San Francisco by December 1 to save $15 on all Conference Sessions* and Exhibits ($75 now vs. $90 cash at the door), or $10 on Exhibits-only admission ($20 now vs. $30 cash at the door). When you preregister, you receive your admission badge in advance so you can walk right into MACWORLD Expo. There's no waiting in line.

SPECIAL EXPO OFFER: 6 Issues of MACWORLD Magazine

Your registration fee to MACWORLD Expo/San Francisco will include a six-issue subscription to *Macworld Magazine*. To receive your six issues, simply fill out the Special Expo Card at one of the *Macworld* booths during the show. Your first issue of *Macworld Magazine* will be mailed to you soon after the conclusion of MACWORLD Expo.

Early Bird Registration

If you miss the preregistration deadline on December 1, you can still register before the start of the show! On-site Early Bird Registration is from 11 a.m. - 3 p.m. on January 5, at the full registration rates of $90 (cash at the door) for all Conference Sessions* and Exhibits, and $30 for Exhibits-only admission (cash at the door).

Prerecorded Information

To listen to prerecorded information about MACWORLD Expo/San Francisco 1993, call the MACWORLD Expo Information Hotline at 617-361-3941 (24 hours a day, seven days a week). We'll see you in San Francisco!

Hotel Accommodations and Sweepstakes!

Every San Francisco-area hotel listed below is offering MACWORLD Expo discounts and participating in the MACWORLD Expo Hotel Sweepstakes! To receive the preferred rates and enter the sweepstakes, simply call one of the hotels and mention you're going to MACWORLD Expo. There's a limited number of rooms available at preferred rates, so make your plans early! When making your hotel reservation, and your choice/reservation is indicated on your preregistration form and is confirmed by the hotel by December 1, you will automatically be entered to win one of three prizes. Every participating hotel will have a first, second and third prize winner:

First Prize: MACWORLD Expo will pay for your hotel (room & tax for one reservation only) for the duration of your stay at the Expo! (Four nights maximum.)

Second Prize: MACWORLD Expo will pay for your hotel (room & tax for one reservation only) for one night!

Third Prize: MACWORLD Expo will reimburse you for your preregistration fee: $20 Exhibits Only, or $75 Conference and Exhibits! (Registration for one person only.)

Note: To qualify, please indicate on your Preregistration form the name of the hotel you will be using (Question #52). Please be sure to mention MACWORLD Expo, and make your reservation before the December 1 preregistration deadline.

Hotels

Ana Hotel; $150, $160
50 Third Street, 415-974-6400

Fairmont Hotel; $95, $125
Atop Nob Hill, 415-772-5000

Grand Hyatt; $139, $139
345 Stockton Street, 415-398-1234

Holiday Inn Civic Center; $97, $112
50 Eighth Street, 415-626-6103

Holiday Inn Golden Gateway; $102, $102
1500 Van Ness Avenue, 415-441-4000

Holiday Inn Union Square; $115, $135
480 Sutter Street, 415-398-8900

Hyatt Regency; $142, $162
5 Embarcadero Center, 415-788-1234

King George Hotel; $95, $105
334 Mason Street, 415-781-5050

Hotel Nikko; $140, $155
222 Mason Street, 415-394-1111

Pan Pacific Hotel; $175, $175
Five Hundred Post Street, 415-771-8600

Parc Fifty Five; $140, $155
55 Cyril Magnin Street, 415-392-8000

The Ritz Carlton; $170, $170
600 Stockton at California St., 415-296-7465

San Francisco Hilton; $145, $165
333 O'Farrell/On Hilton Sq., 415-771-1400

San Francisco Marriott; $164, $184
55 Fourth Street, 415-896-1600

Sheraton Palace; $145, $160
2 New Montgomery Street, 415-392-8600

Sir Francis Drake; $100, $100
450 Powell Street, 415-392-7755

Stouffer Stanford Court Hotel; $149, $169
Nob Hill, 415-989-3500

The Westin St. Francis; $140, $160
335 Powell Street, 415-397-7000

(Rooms are priced for single and double occupancy.)

Show Hours

Exhibition Hours	Conference Hours
Jan. 6: 10 a.m. - 6 p.m.	10:30 a.m. - 5:30 p.m.
Jan. 7: 10 a.m. - 6 p.m.	10:30 a.m. - 5:30 p.m.
Jan. 8: 10 a.m. - 6 p.m.	10:30 a.m. - 5:30 p.m.
Jan. 9: 10 a.m. - 4 p.m.	10:30 a.m. - 3:30 p.m.

*All conference sessions are on a first-come, first-served basis with no guaranteed seating.

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KALEIDOSCOPE OF DISCOVERY

Wednesday, January 6 - Saturday, January 9, 1993 at Moscone Center

When you look out over the exhibit floor at MACWORLD Expo, it's like looking through a kaleidoscope. Just a slight turn to the left or right, and you get an entirely new and fantastic view. In every direction, there's something different. Something dynamic. Something daring.

These new and fantastic sights are what MACWORLD Expo is all about: presenting a creative vision to stay ahead of our changing world. At MACWORLD Expo, the Macintosh becomes a kaleidoscope, an instrument of constant change and fascination.

What You Seek Is What You Get

As the world's largest Macintosh event, MACWORLD Expo showcases uses and applications for the Mac in Networking, Spreadsheet Analysis, Databases, Education, Research, Word Processing, Accounting, Law, CAD/CAM, Forecasting, Design, Publishing, Illustration, Animation, Music, Programming, Entertainment and Multimedia (to name but a few.)

What you seek is what you get: you'll find all the latest in hardware, software, peripherals and services at MACWORLD Expo!

MACWORLD Expo/San Francisco 1993: When and Where

This year's MACWORLD Expo/San Francisco promises to be bigger and better than ever: over 500 companies will cover 300,000 square feet of space at San Francisco's newly expanded Moscone Center. Mark your calendars for January 6-9 to see the Macintosh at its absolute best.

The Conference Program

In addition to the 500-company strong Exhibition, MACWORLD Expo/San Francisco also offers a complete Conference Program of intensive seminars. Guided by a distinguished faculty comprised of those who truly lead the Macintosh industry, as well as cutting edge users who are driving the demand for technology, the Conferences offer insights that are simply not available anywhere else. You can expect to come away from MACWORLD Expo smarter, more productive, and inspired!

The Education Conference

If your specialty is education, assign yourself to MACWORLD Expo's MacResource Center. Sponsored by Apple Computer, Inc. and A+ Publishing, the Center is a place for Macintosh-using educators to take a break from the show floor, discover new software solutions and review the Official MACWORLD Expo Guide for Educators. Visit the Center and you may be eligible to win free software, Apple gifts, or a brand new PowerBook computer.

If You're Used to Looking at Life Through a Window, May We Recommend a Kaleidoscope?

If you're a committed DOS user, MACWORLD Expo/San Francisco still has something for you. First, you'll see the unique advantages offered by the Macintosh; you'll find solutions on the Mac that are just not possible with DOS. You'll also learn about Mac/DOS connectivity and how to take best advantage of both systems. To put the power of Macintosh to work for you, make your Mac connection at MACWORLD Expo/San Francisco!

The Multimedia Conference

The demand for multimedia sessions at MACWORLD Expo has grown so great that we've developed a separate, full-scale, two-day program to accommodate all the multimedia topics you've been requesting — and more! More than 20 multimedia sessions will dazzle and delight attendees with: real-world experiences of multimedia users fresh from the trenches; popular-demand topics on creating exceptional quality productions and presentations with both high-end and low-end multimedia tools; state-of-the-art reports from the industry's leading vendors on the most exciting new developments in the hottest multimedia technologies; an invaluable treasury of how-to tips, insights and guidelines; and how users are applying multimedia technologies to deliver the most powerful message possible to a target audience.

Don't Miss Out on Incredible Preregistration Savings

Preregister NOW for MACWORLD Expo/San Francisco to take advantage of incredible savings! When you return the attached preregistration card with your payment by December 1, you'll save $15 on all Conference Sessions* and Exhibits ($75 now vs. $90 cash at the door), or $10 on Exhibits-only admission ($20 now vs. $30 cash at the door). Preregistration not only saves you money, it also saves you time. When you preregister, we send you your admission badge early so you can walk right into MACWORLD Expo. No fuss. No waiting. You get a jump on the thousands of people expected at the Expo!

The deadline to receive your preregistration discount is fast approaching. Fill out the attached form today and send it in with your payment by check or credit card. If the registration form is missing from this ad, or if you have any other questions, call the prerecorded MACWORLD Expo Information Hotline at 617-361-3941. Then get ready to see Macintosh's creative vision in a changing world. You'll see wonderful things through the kaleidoscope of MACWORLD Expo.

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Illustrations by Mick Wiggins

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PREREGISTER FOR MACWORLD EXPO/SAN FRANCISCO BY DECEMBER 1 AND SAVE $10 TO $15

The largest Macintosh event in the world will be in San Francisco from Wednesday, January 6 through Saturday, January 9, 1993 at Moscone Center. And when you preregister by December 1, you'll save time and money.

Please choose your package and fill out the form completely. Incomplete forms will be returned. **One form per person; make photocopies for additional people.** Please do not staple check to form. Registration forms received after December 1 will be returned. PURCHASE ORDERS CANNOT BE ACCEPTED. ALL REGISTRATION FEES ARE NONREFUNDABLE.
Send completed forms to:

MACWORLD Expo/San Francisco
P.O. Box 4010
Dedham, MA 02026

U.S. Attendees: You will be mailed your badges on or about December 20. Be sure to check box indicating where badge should be sent.

International Attendees (including Canadian): Your badge will be held for pick-up at the Non- U.S. Preregistration counter at Moscone Center for pickup beginning Tuesday, January 5. If you want your badge sent to you instead, check the appropriate box below and add $45 to your preregistration fee. Fill in your exact street address (no P.O. boxes) and include your telephone number and country code. We will Federal Express your badge directly to you.

SPECIAL EXPO OFFER
6 Issues of MACWORLD Magazine: Your registration fee to MACWORLD Expo/San Francisco will include a six-issue subscription to Macworld Magazine.
To receive your six issues, simply fill out the Special Expo Card at one of the Macworld booths during the show. Your first issue of Macworld Magazine will be mailed to you soon after the conclusion of MACWORLD Expo.

Please register me for:

☐ **Package One $75**
Conference sessions* and exhibits. Preregister by December 1 ($90 cash only at the door).

☐ **Package Two $20**
Admission to exhibits only. Preregister by December 1 ($30 cash only at the door).

☐ **Check if applicable.** I'm an International attendee and would like my badge shipped by Federal Express. Enclosed is an additional $45.

Please send my registration badge and further information to:

Please check one: ☐ Home Address ☐ Company Address

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City ___/___/___/___/___/___/___/___/___/___/___/___/___/___/ State ___/___/ Zip ___/___/___/___/___/-___/___/___/___/

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Cash only at the door. After December 1, you must register at the show.

Please check the appropriate information:

Your industry or profession

01. ☐ Advertising
02. ☐ Arts/Entertainment
03. ☐ Business
04. ☐ Communications/publishing
05. ☐ Consultant
06. ☐ Distributor/dealer/retailer/service
07. ☐ Engineering
08. ☐ Government
09. ☐ Health services
10. ☐ Higher Education
11. ☐ Information services
12. ☐ K-12 Education
13. ☐ Legal services
14. ☐ Manufacturer (computer industry)
15. ☐ Manufacturer (non-computer)
16. ☐ Other (specify)_____

Your title

17. ☐ CEO/President/VP
18. ☐ DP/MIS Manager
19. ☐ Manager/Department head
20. ☐ Network Manager
21. ☐ Programmer/analyst
22. ☐ Engineer/R & D
23. ☐ Consultant
24. ☐ Marketing/sales
25. ☐ Educator
26. ☐ Art director/graphics
27. ☐ Editor/writer
28. ☐ R & D
29. ☐ Student
30. ☐ Other (specify)_____

Size of your organization (number of employees national and international)

31. ☐ Under 50
32. ☐ 50–99
33. ☐ 100–499
34. ☐ 500–999
35. ☐ 1,000–5,000
36. ☐ Over 5,000

Which personal computer(s) do you own/use?

37. ☐ Macintosh (128K, 512K(E))
38. ☐ Macintosh Plus
39. ☐ Macintosh Classic/Classic II
40. ☐ Macintosh LC
41. ☐ Macintosh SE/SE 30
42. ☐ Macintosh II/IIx
43. ☐ Macintosh II si
44. ☐ Macintosh II cx/ci
45. ☐ Macintosh II fx
46. ☐ Macintosh Quadra Series
47. ☐ Macintosh Portable/PowerBook Series
48. ☐ Apple II Series
49. ☐ IBM PC (or compatible)
50. ☐ None
51. ☐ Other (specify)_____

Which hotel are you using?

52. Enter the MACWORLD Expo Hotel Sweepstakes by entering your participating hotel choice here:_____

*MACWORLD Expo conference sessions are on a first-come, first-served basis with no guaranteed seating and are subject to change without notice. All registration fees are nonrefundable. Do not staple check to form. Send completed form, with check or money order to: MACWORLD Expo, P.O. Box 4010, Dedham, MA 02026.

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Magic 2.1GB Seagate*.....$2799

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Magic 128MB Turbo Epson Optical*.....$1299
Magic 128MB REM MOST Optical*.....$1199
Magic 256/128MB 3.5" Cartridges.....$99/$59

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Magic 45R/88R SyQuest Drive**.....$449/$499
SyQuest 45 & 88 Cartridges.....$69/$119

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Magic 5.0GB 8mm Backup*.....$3799

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Magic NEC CD-ROM (CDR74).....$699

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MAGIC AFX & PKT FAXMODEMS

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MAGIC VFX FAXMODEM

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PROCESSOR	25MHZ MOTOROLA 68030	25MHZ MOTOROLA EC68030
MATH FPU	68882 BUILT-IN	FPU NOT INCLUDED
PMMU	BUILT INTO 68030	NOT INCLUDED
VIDEO PATH	32-BIT	16-BIT
VIDEO CLOCK	16.25,33. & 40MHZ	8MHZ
MONITOR RES.	1152 x 876	1024 x 768
VIDEO SUPPORT	ALL 3RD PARTIES	ONLY MOBIUS DISPLAYS
VIRTUAL RAM	USING *VIRTUAL 3.0*	NOT AVAILABLE
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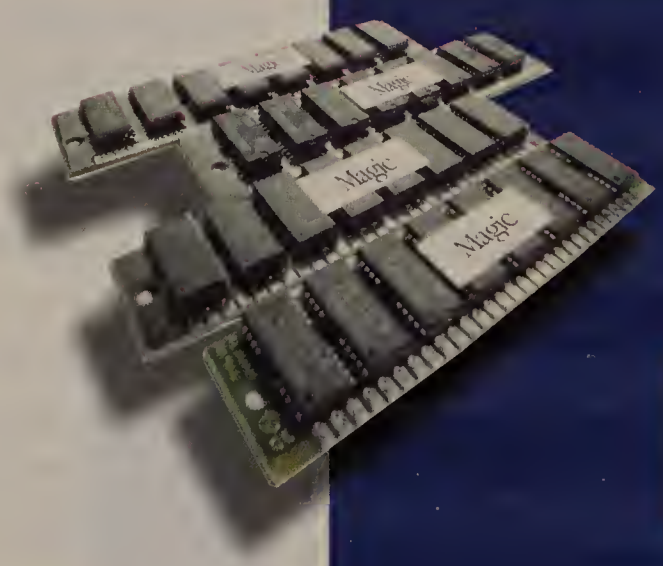

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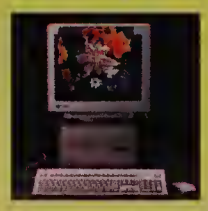

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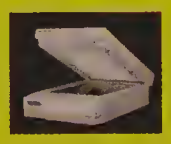

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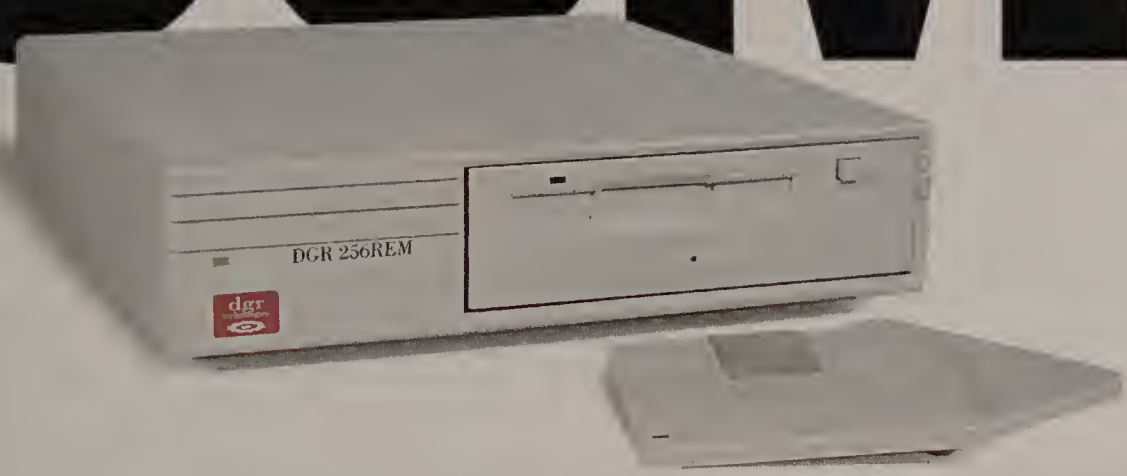

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-DGR 128MB REM, MacUser Magazine, 3.5" Optical Hard Drive Review, July 1992

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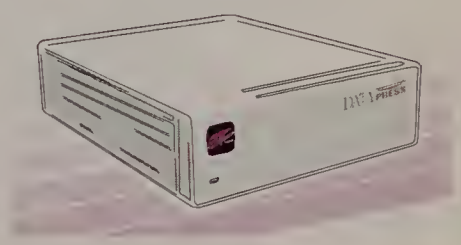
November, 1992

Circle 85 on reader service card

It's a Vintage Year For Data Compression

The ETC DataPress offers a robust bouquet of features that includes "real-time" hardware data compression, SCSI bus expansion, and more at a price that is pleasing to the palette.



On average, the ETC DataPress doubles the capacity of your drive. It can even compress some files as high as 15-to-1, making the DataPress less expensive than buying another drive for your system.

The making of fine wine is a complicated and time consuming process that should be left to experts. Data compression on the Macintosh® used to be just as difficult—until the invention of the DataPress™.

The DataPress, which ships with *More Disk Space*™ by Alysis, offers the fastest and most complete system for squeezing space out of your hard disk drive. And its speed is unparalleled. The DataPress doesn't use slow background software tricks. When it writes a file to your hard disk, the data is compressed—"real-time"—so that there is no chance of lost data or time.

***More Disk Space*™ from ALYSIS** *is included with the ETC DataPress to provide the easiest and fastest data compression possible on the Mac!*

Plus, it's easy to use. Just plug the DataPress into the SCSI port on your Macintosh, and install the software. From there, the DataPress can transparently compress and decompress any file anywhere on your SCSI chain—including those on your internal drive! Just save a file and it's compressed. It's that easy.

Besides data compression, the DataPress enables you to expand the capabilites of your SCSI bus. It is a gateway to another complete SCSI chain of seven additional devices.

And there's more. At the core of the DataPress is ETC's SmartPeripheral™ Engine, an innovation that brings dumb peripherals to life. Empowering them to do things they've never done before. In this engine we've used a Flash EPROM that allows you to add future *SPE Options* by "double-clicking" on an auto-installing icon.

What are *SPE Options*? These are programs that run on the DataPress to add features like: disk mirroring, super volumes, RAID, encryption, and continuous off-line storage of removable magnetic media.

So how do you choose the best data compression solution around? It's a lot less intimidating than choosing a good wine. **Call 1-800-876-4ETC.**

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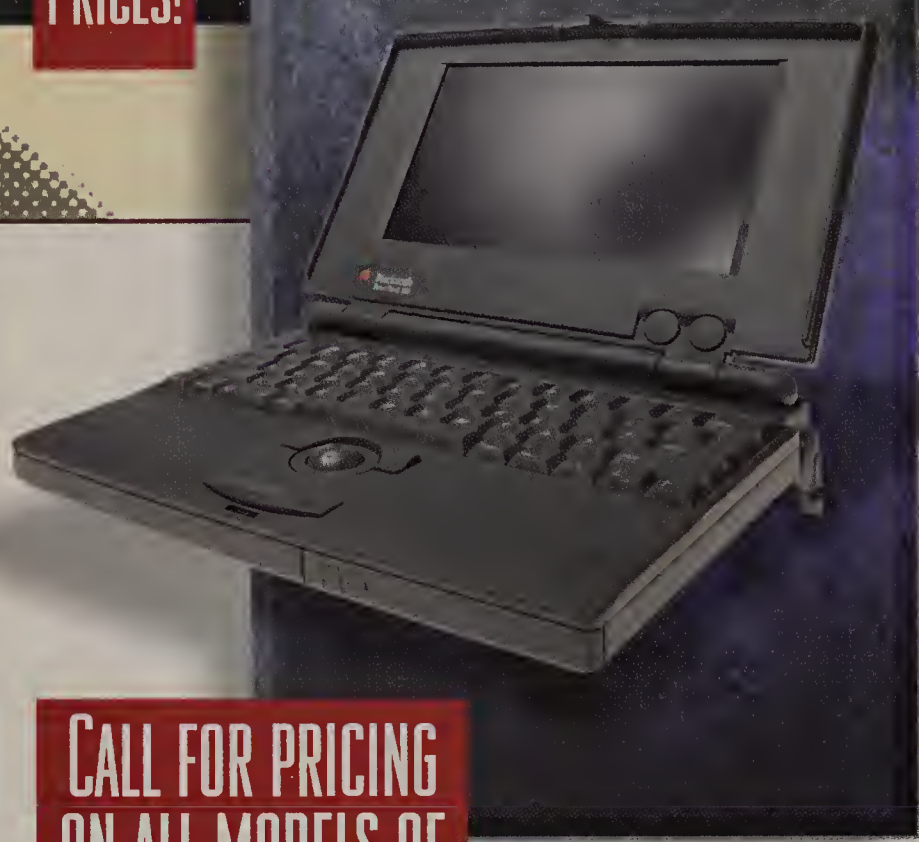

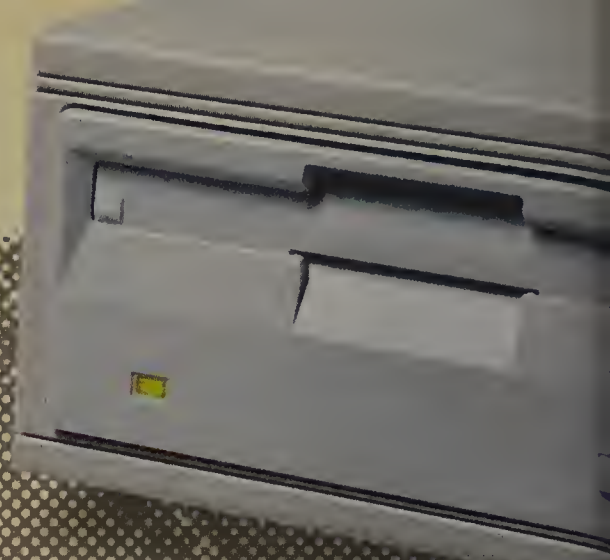

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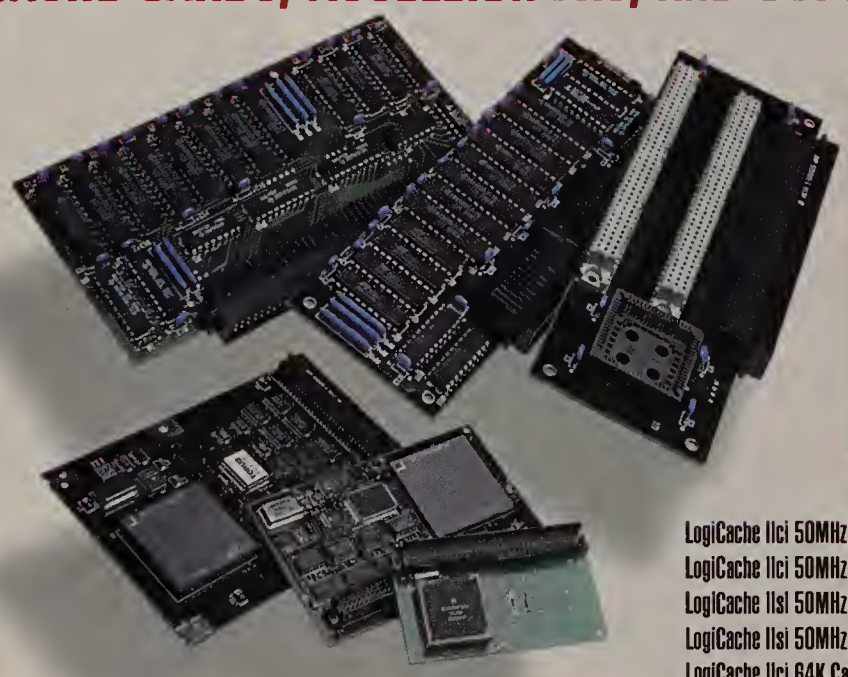

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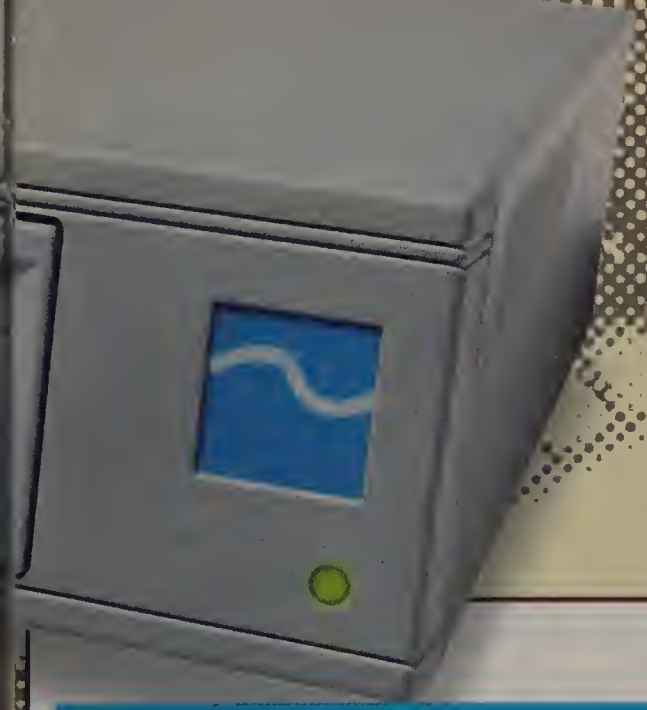

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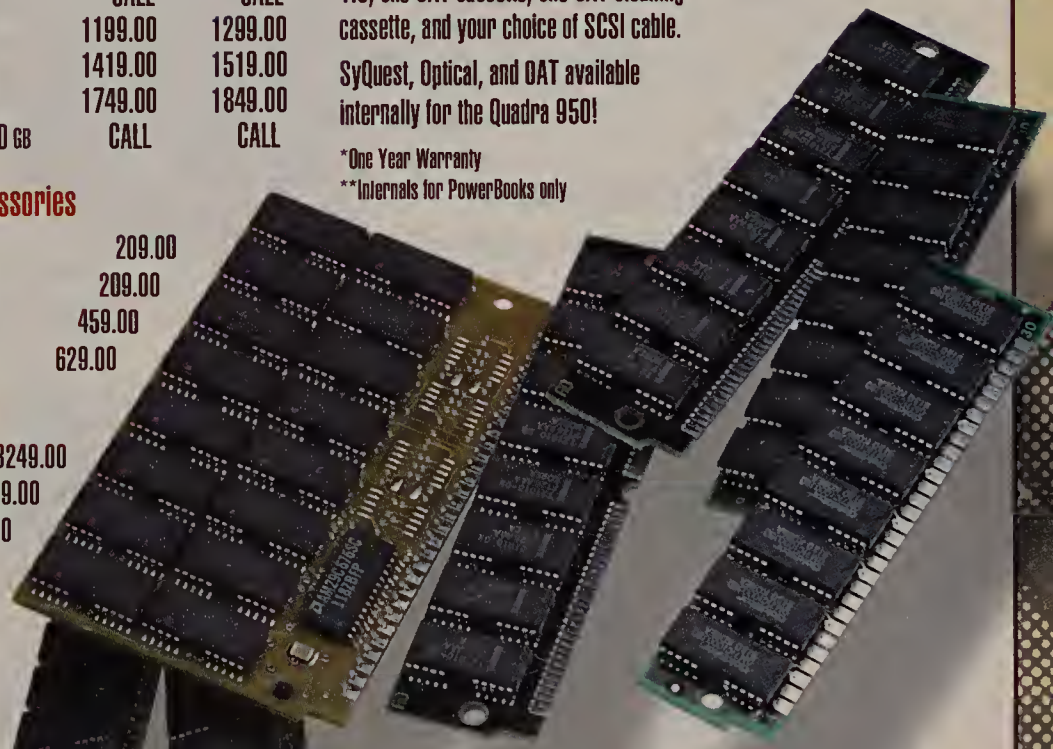

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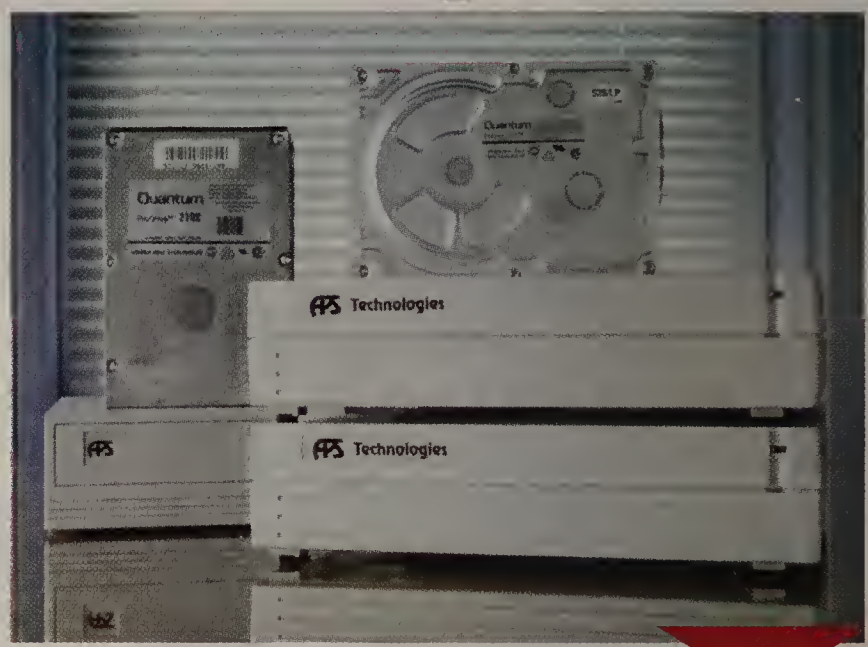

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MB	INTL	EXTL
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340	859	959
535	1249	1349
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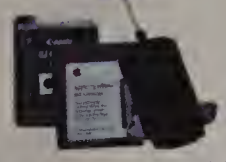

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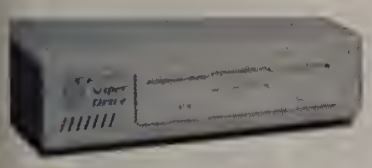

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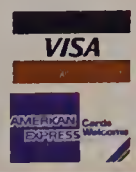

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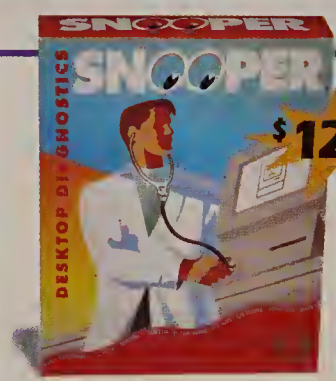

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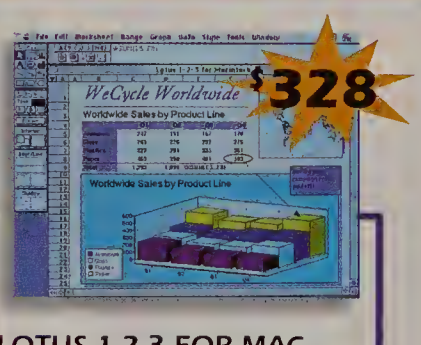

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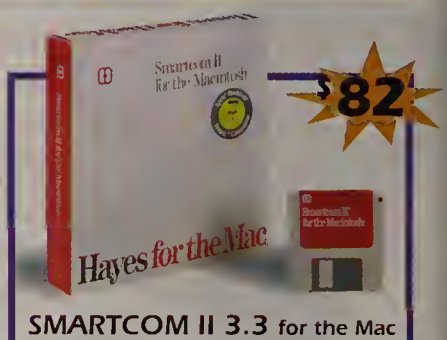

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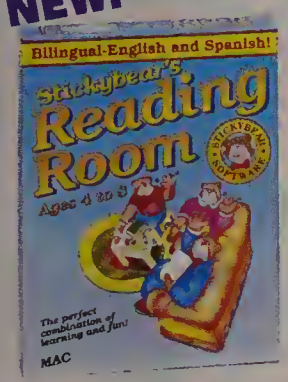

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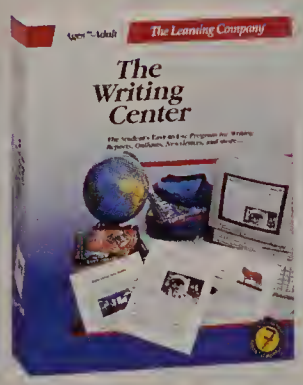

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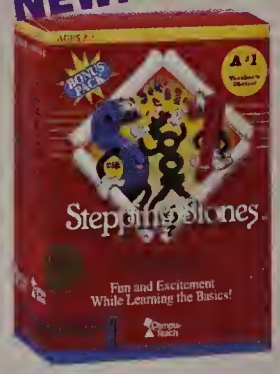

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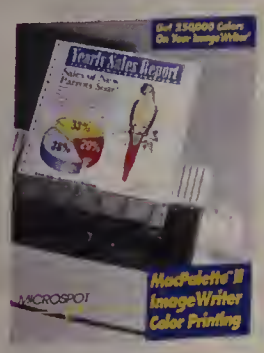

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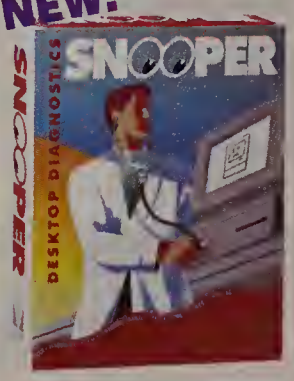

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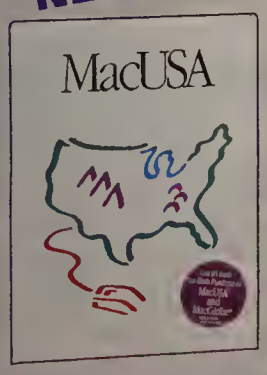

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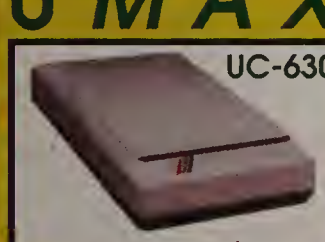

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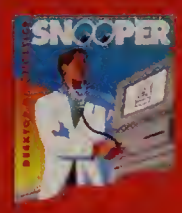

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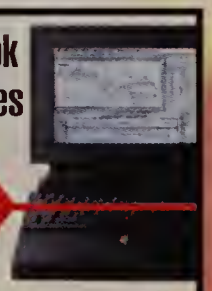

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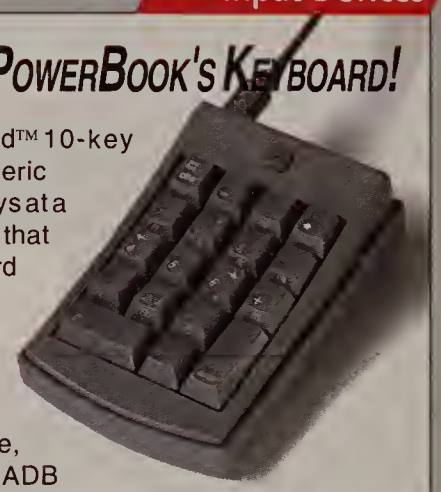

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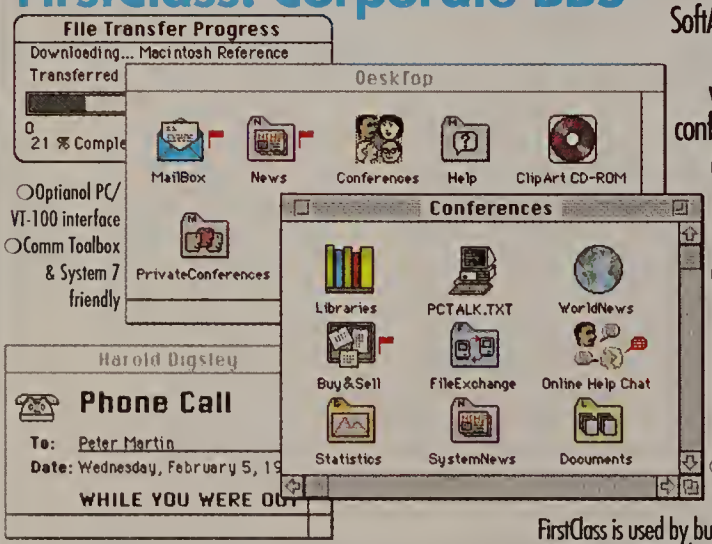

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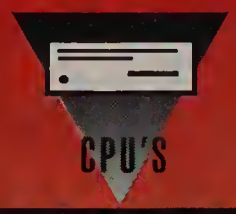
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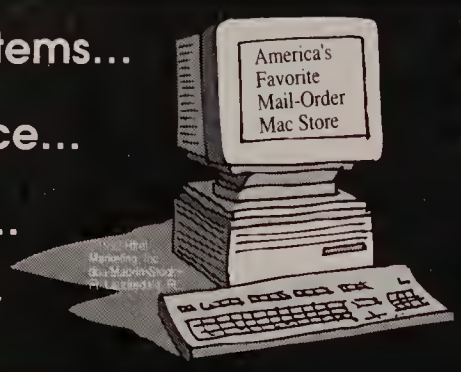

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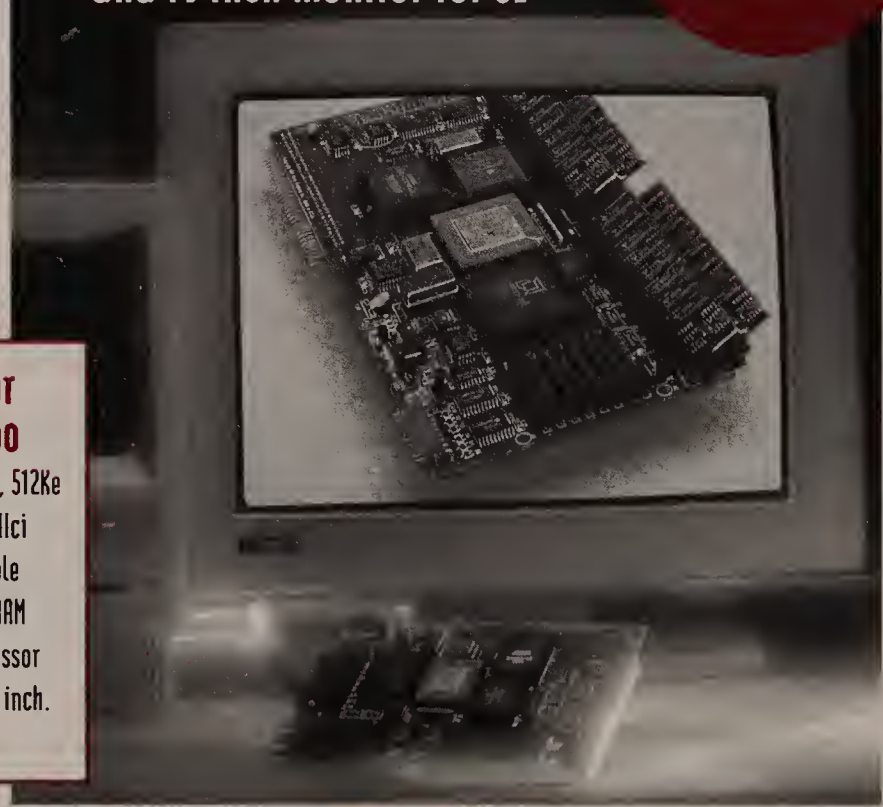

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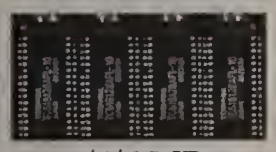

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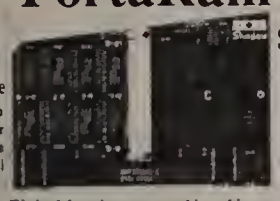

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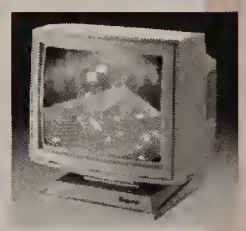

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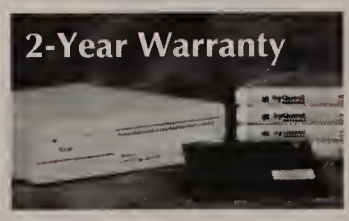

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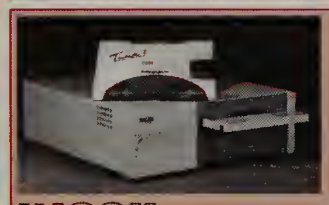

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Classic Accelerator w/Co-Processor	289
Powerbook 100 - 4 Meg. Card	239
Powerbook 100 - 6 Meg. Card	349
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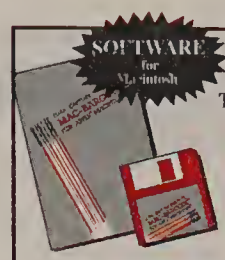

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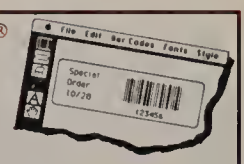

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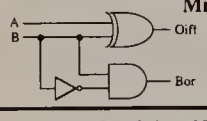

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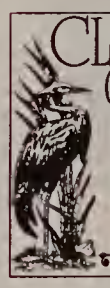

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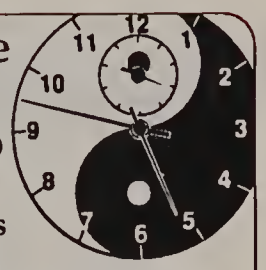

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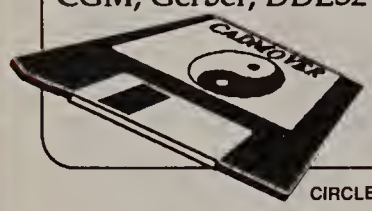

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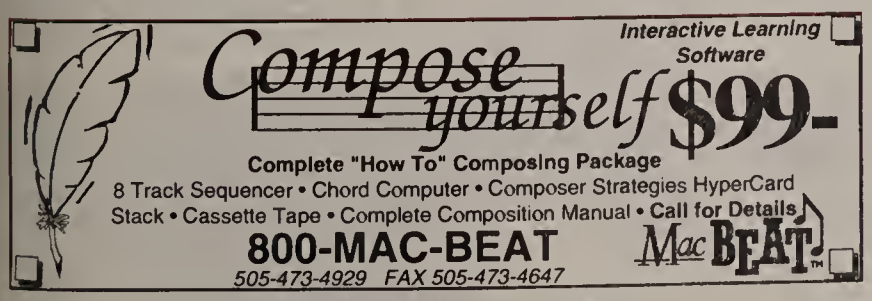

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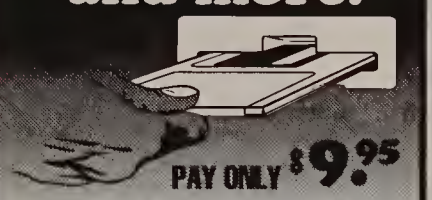

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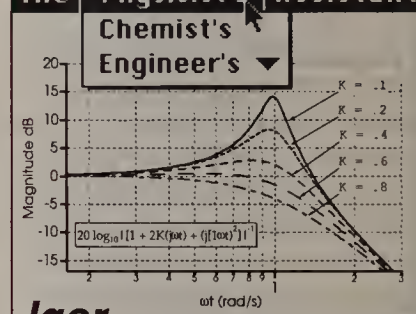

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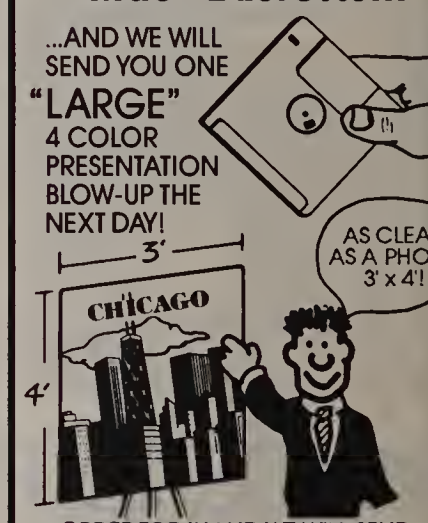

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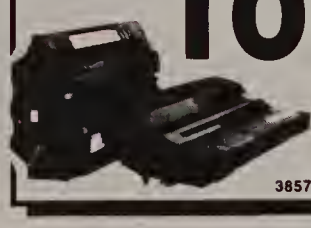

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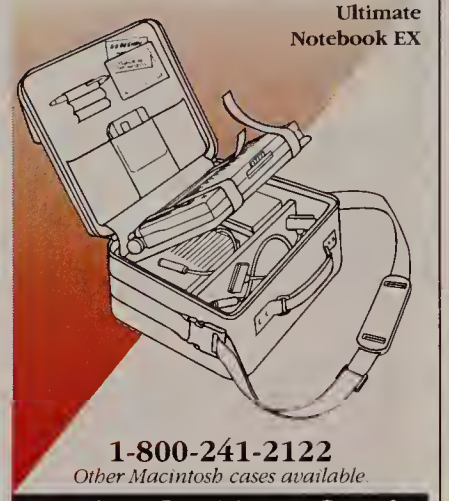

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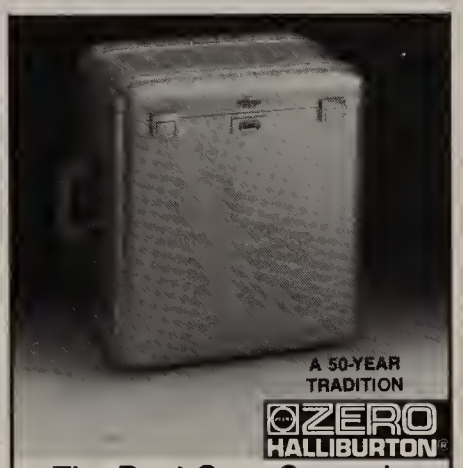

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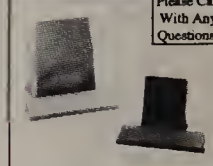

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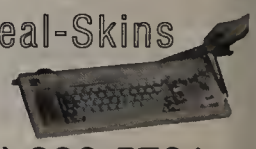

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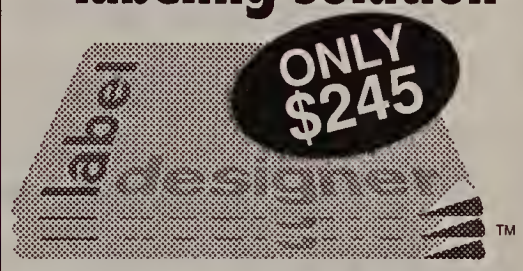

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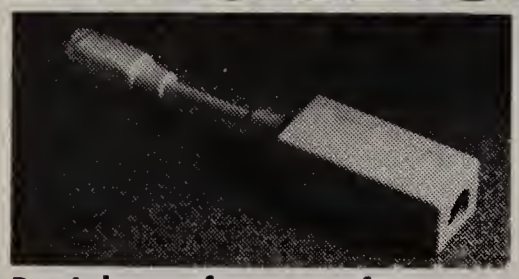

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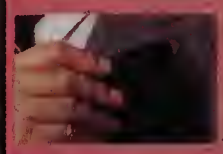

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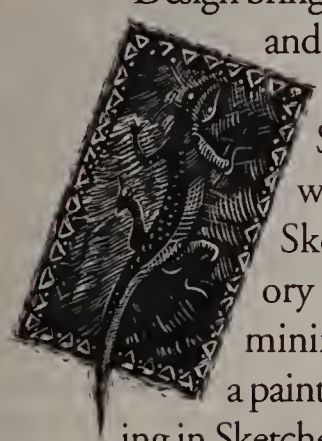

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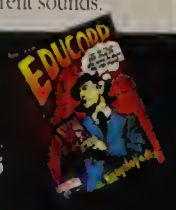

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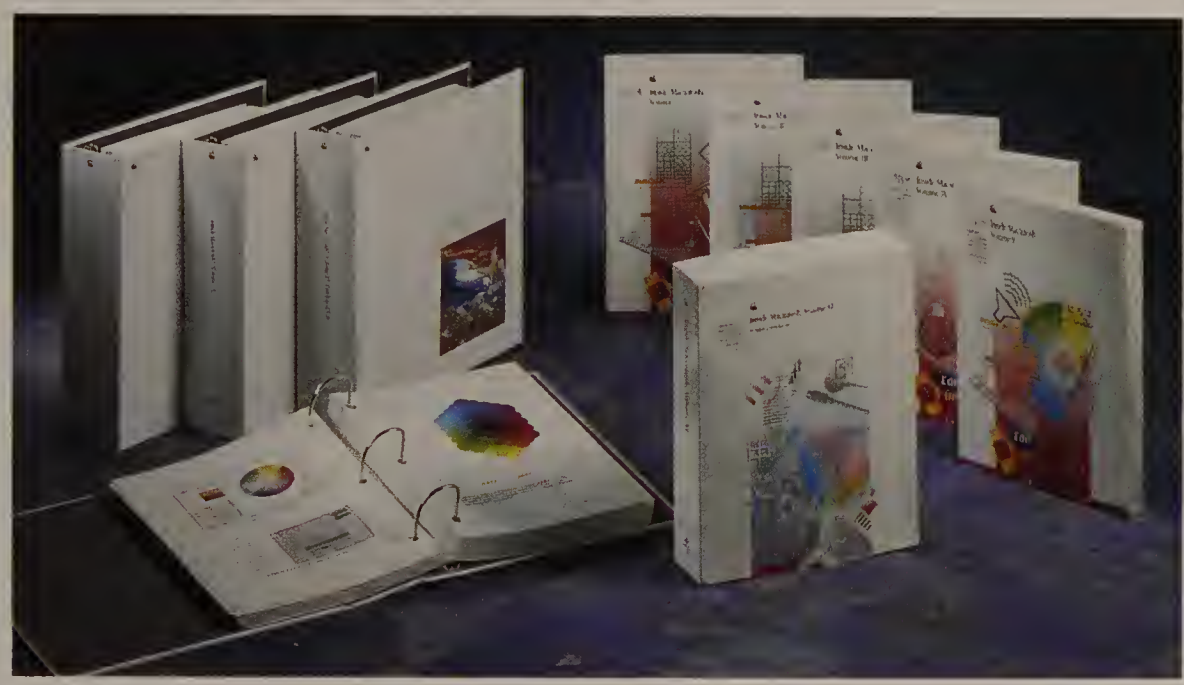

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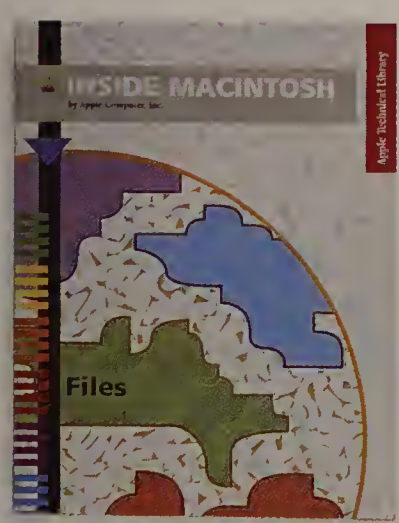

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Introducing *New Inside Macintosh*

Inside Macintosh is Apple's official guide and essential resource for Macintosh programming. Three years ago, we began extensive research to determine how we could improve it to better meet your needs. Dozens of interviews, surveys, and focus groups have helped us create a new approach to describing the Macintosh technology.

New Inside Macintosh is completely reorganized to help you find the information you need more quickly. It's also designed to be easily updated, so you can stay current with new technology. And it includes far more explanatory material and more extensive examples than before. You'll also appreciate these new features:

- **Subject organization**–Each book in the series covers a single topic. For example, everything you need to know about Macintosh files, such as file menu commands and the file manager, is described in a single book. You'll save plenty of time with this restructured approach.
- **Overall perspective**–With more tutorial and explanatory material, each book offers a clear overview of how each component relates to the entire Macintosh technology.
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Best-Sellers

NOVEMBER 1992

Business Software

Months on chart	Last month	This month		
12	2	1	**Microsoft Office**	*Microsoft Corporation*
90	1	2	**Microsoft Word**	*Microsoft Corporation*
81	3	3	**Microsoft Excel**	*Microsoft Corporation*
11	5	4	**MacDraw Pro**	*Claris Corporation*
42	6	5	**FileMaker Pro**	*Claris Corporation*
4	8	6	**ClarisWorks**	*Claris Corporation*
42	4	7	**WordPerfect for the Macintosh**	*WordPerfect Corporation*
28	11	8	**Quicken**	*Intuit*
65	12	9	**MacDraw II**	*Claris Corporation*
11	10	10	**Aldus Persuasion**	*Aldus Corporation*
20	—	11	**MacProject**	*Claris Corporation*
5	13	12	**1-2-3 for the Macintosh**	*Lotus Development*
66	15	13	**MacWrite II**	*Claris Corporation*
77	9	14	**Aldus PageMaker**	*Aldus Corporation*
68	7	15	**Microsoft Works**	*Microsoft Corporation*

Education Software

Months on chart	Last month	This month		
57	1	1	**Reader Rabbit**	*The Learning Company*
24	3	2	**Where in Time Is Carmen Sandiego?**	*Brøderbund Software*
14	—	3	**Math Rabbit**	*The Learning Company*
43	2	4	**Where in the World Is Carmen Sandiego?**	*Brøderbund Software*
68	5	5	**Math Blaster**	*Davidson & Associates*

Entertainment Software

Months on chart	Last month	This month		
2	2	1	**King's Quest IV**	*Sierra On-Line*
55	3	2	**Microsoft Flight Simulator**	*Microsoft Corporation*
30	1	3	**Tetris**	*Spectrum HoloByte*
32	—	4	**SimCity**	*Maxis*
19	5	5	**Crystal Quest**	*Casady & Greene*

Network/Data Communications

Months on chart	Last month	This month		
36	1	1	**PhoneNet**	*Farallon Computing*
5	3	2	**AppleTalk Remote Access**	*Apple Computer*
59	2	3	**AppleShare**	*Apple Computer*
20	—	4	**MacLink Plus**	*DataViz*
14	—	5	**Netware for Macintosh**	*Novell*

Add-In Boards

Months on chart	Last month	This month		
19	1	1	**Macintosh IIsi NuBus Adapter Card**	*Apple Computer*
23	3	2	**Macintosh Display Card 8•24**	*Apple Computer*
20	4	3	**Pivot**	*Radius*
5	—	4	**Spectrum/8 Series**	*SuperMac*
5	—	5	**Macintosh IIfx Logic Board Upgrade**	*Apple Computer*

Utility Software

Months on chart	Last month	This month		
18	1	1	**After Dark**	*Berkeley Systems*
8	4	2	**More After Dark**	*Berkeley Systems*
24	2	3	**Norton Utilities for Macintosh**	*Symantec Corporation*
29	3	4	**SAM**	*Symantec Corporation*
19	5	5	**Virex**	*Microcom*

The AmCoEx Index of Used Macintosh Prices

Machine/RAM/ Hard Drive	Average Sale Price	Monthly Change
Mac Plus/1MB/none	$300	–$25
Mac Plus/2MB/20MB	$425	–$50
Mac SE/2MB/20MB	$850	+$50
Mac Portable/1MB/40MB	$750	–$100
Mac Classic/2MB/40MB	$750	$0
Mac SE/30/2MB/40MB	$1700	+$25
Mac LC/2MB/40MB	$925	–$25
Mac II/4MB/40MB	$1725	–$50
Mac IIsi/3MB/40MB	$1775	–$50
Mac IIcx/4MB/80MB	$2400	+$50
Mac IIci/4MB/80MB	$2950	+$100
Mac IIfx/4MB/80MB	$3800	+$100
Apple 12-inch B&W display/board	$225	$0
Apple 13-inch RGB display/board	$575	–$25
LaserWriter Plus	$950	–$100
LaserWriter IINT	$1650	–$50

Index provided by the American Computer Exchange of Atlanta, Georgia. It reflects sales during the week of August 18. Configurations include keyboard and exclude monitor and display board for noncompact models.

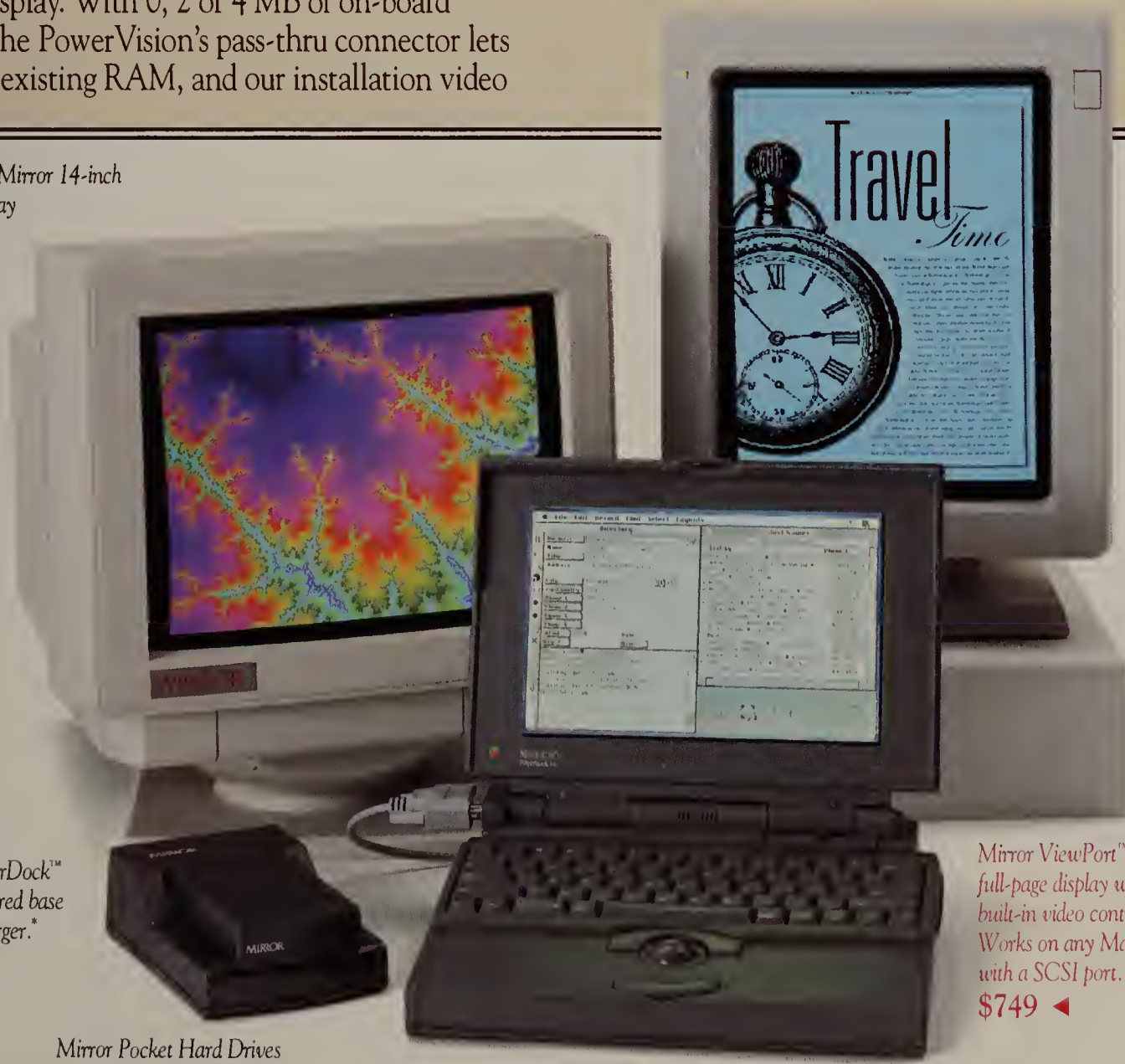
Source: Exclusive Audits & Surveys research from more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during July 1992.

Mirror Introduces Desktop Performance For Your Powerbook...

With Mirror's exciting new peripherals, your PowerBook can function just like a desktop machine, with a high resolution monitor and plenty of storage.

The ***Mirror PowerVision***™, an internal video board for the PowerBook 140 or 170, works with a variety of standard monitors, including our NEW 14-inch Color Display and 15-inch Gray-scale Display. With 0, 2 or 4 MB of on-board RAM, the PowerVision's pass-thru connector lets you use existing RAM, and our installation video makes setup a snap (professional installation also available).

The ***Mirror ViewPort***™ is a 15-inch monochrome display with a built-in SCSI video controller and QuickDraw acceleration for performance rivaling internal video boards. Ideal for PowerBooks, the ViewPort brings big screen power to any Mac with a SCSI port. *(continued)*



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PowerVision internal video adapter board includes tools and a comprehensive installation video. *from* **$549**†

Systems including PowerVision board and display *from* **$948**†

*Uses your PowerBook battery and AC adapter. †Call for other options.

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The NEW Mirror 14-inch Color Display is the latest version of our best selling color monitor. Designed to work with the built-in video of your Mac LC, IIsi, IIci, or Quadra--or with Mirror's PowerVision video board for PowerBooks; this display features razor-sharp focus and brilliant color and it's still only $399!†

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127 MB (Q)	$449	$499
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240 MB (Q)	$699	$749 ◀
425 MB	N/A	$1,149 ◀
425 MB (Q)	$1,149	$1,199 ◀
595 MB	N/A	$1,499 ◀
1 GB	N/A	$1,999
50 MB (Q) Portable Drive		$299
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w/ 16-bit video card	$1,599
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With the all new Brilliant Cursor™ technology, you can actually make the cursor jump to any spot on the screen.

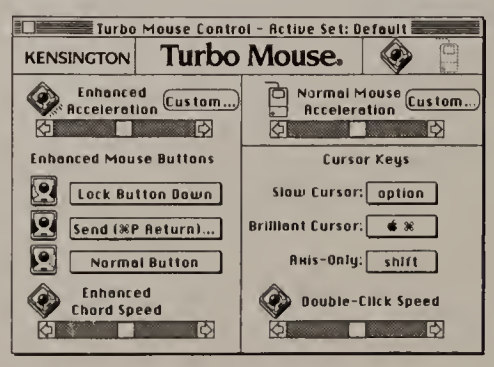
While the cursor may hop or skip with some trackballs, Turbo Mouse® has always been known for its ultrasmooth movement.

Now, the latest version of Turbo Mouse is known for something else—jumping. Our new Brilliant Cursor technology makes it possible.

With it, you can move the cursor instantly to predefined HotSpots on the screen, such as the File and Edit menus and the Trash icon.

First, you define your HotSpots. Then, click a button and move the ball in the direction you want to go. The cursor automatically jumps to the predefined HotSpot. You can even program in different HotSpots for different applications and for different users.

And Brilliant Cursor technology is not all that's new with Turbo Mouse 4.0. Also new is advanced acceleration with three levels of control and Enhanced Mouse Buttons that let you execute one of seven programmable commands. For example, send a Print command with just one click using Send String. Or move the cursor with ultra precision using Slow Cursor. Even save different combinations of commands for each of your favorite programs.



Then there's the award winning Turbo Mouse hardware. Hardware that has won more awards than any other input device. Hardware that has consistently been voted "Best Input Device" by Macintosh users worldwide. Features include a large comfortable ball, "easy-click" buttons, long-lasting precision stainless steel bearings, and two ADB ports for chaining other devices.

Turbo Mouse 4.0 is fully System 7.0 compatible. To receive information by fax, call 800-535-4242, dial 82 and request document 320. For general information, call 800-535-4242. Outside the US, 415-572-2700.

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